McGraw-Hill International

Management Digest

Can the world control the POPULATION EXPLOSION
Page 15

OCTOBER 1967 OVERSEAS EDITION

Talking business in Sao Paulo—and setting the pace for Latin American industry—p18

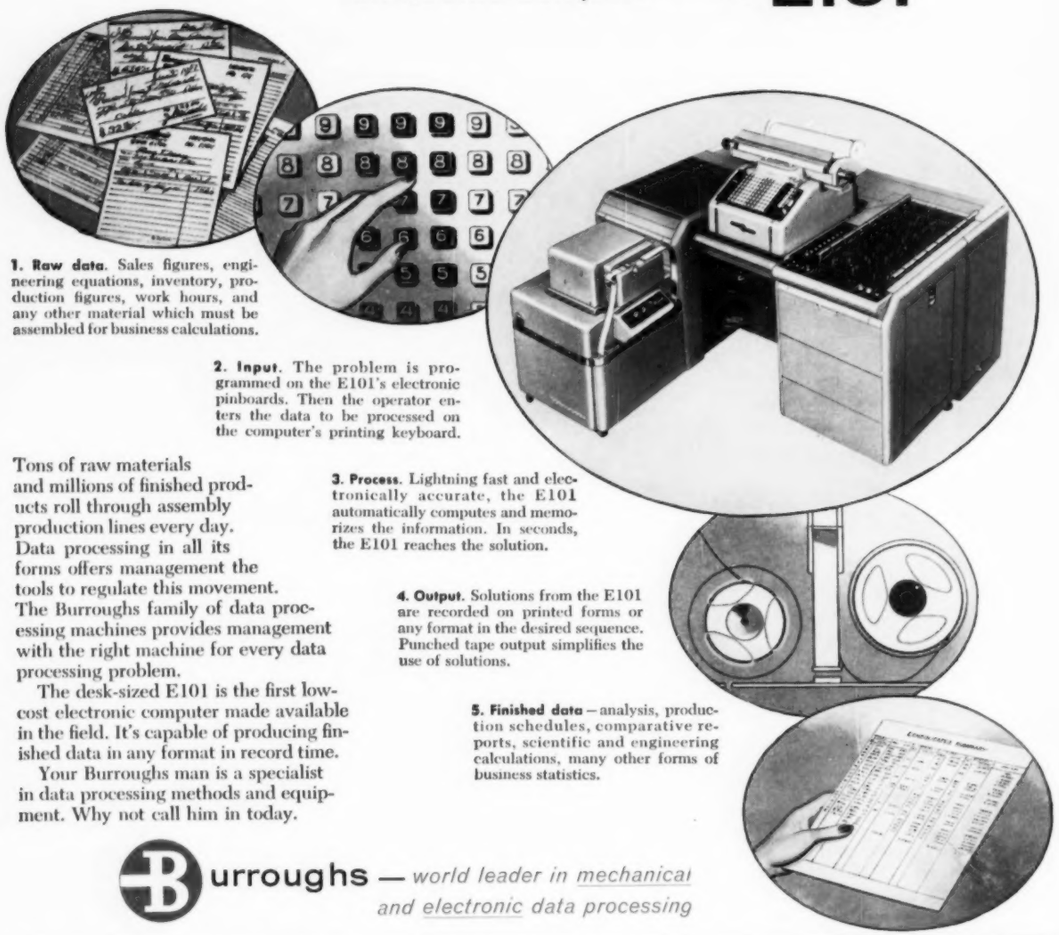
SHOULD YOU GO INTO DEBT?

FIRST

IN DATA PROCESSING

. . . and first with a low cost

electronic computer — the **E101**



1. Raw data. Sales figures, engineering equations, inventory, production figures, work hours, and any other material which must be assembled for business calculations.

2. Input. The problem is programmed on the E101's electronic pinboards. Then the operator enters the data to be processed on the computer's printing keyboard.

3. Process. Lightning fast and electronically accurate, the E101 automatically computes and memorizes the information. In seconds, the E101 reaches the solution.

4. Output. Solutions from the E101 are recorded on printed forms or any format in the desired sequence. Punched tape output simplifies the use of solutions.

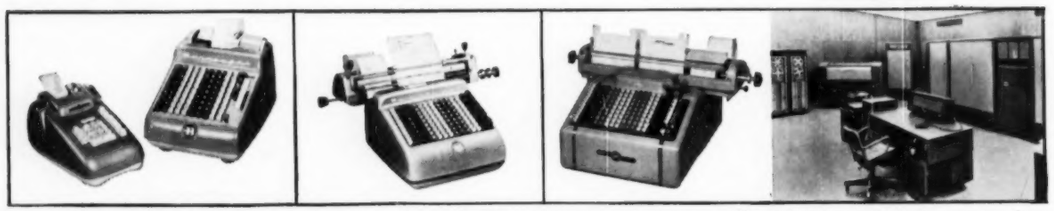
5. Finished data — analysis, production schedules, comparative reports, scientific and engineering calculations, many other forms of business statistics.

Tons of raw materials and millions of finished products roll through assembly production lines every day. Data processing in all its forms offers management the tools to regulate this movement. The Burroughs family of data processing machines provides management with the right machine for every data processing problem.

The desk-sized E101 is the first low-cost electronic computer made available in the field. It's capable of producing finished data in any format in record time.

Your Burroughs man is a specialist in data processing methods and equipment. Why not call him in today.

Burroughs — *world leader in mechanical and electronic data processing*



Basic data processing units — Burroughs Ten Key and Director Adding Machines for quick addition and subtraction

Low-cost mechanized bookkeeping provided by easy-to-operate Director Accounting Machine

Four machines in one, the Sensimatic handles accounting problems in record time

High-speed electronic computer, the Datatron simplifies major data handling problems in every field

Versatile Tractor Loaders for economical material handling work

Rubber-tired tractor loaders fill a need for a fast, dependable, economical way to perform many construction, maintenance and material handling jobs. To meet the demands of a wide variety of conditions, there is a Tracto-Loader for every application . . . a size for any job.

TL-6

CAPACITY: 0.38M³ (½ CU YD)
ENGINE GASOLINE: 33.7 BRAKE HP
DIESEL: 38 BRAKE HP
WEIGHT: 2770 KG (6,100 LB) GASOLINE
2950 KG (6,500 LB) DIESEL

This compact, highly maneuverable machine is ideal for work in confined areas. It quickly unloads boxcars, makes sharp turns around obstructions and goes through narrow aisles and doorways.

TL-20D

CAPACITY: 1.53M³ (2 CU YD)
ENGINE: 100 BRAKE HP
WEIGHT: 10,000 KG (22,100 LB)

The TL-20D offers size, maneuverability and rugged dependability demanded by owners and operators for handling today's big-volume construction assignments. It also offers many advanced-design features for ease of operation and maintenance on all jobs.

TL-10

CAPACITY: 0.76M³ (1 CU YD)
ENGINE: 63 BRAKE HP
WEIGHT: 5400 KG (11,900 LB)

You'll find the TL-10 a big producer on many general-purpose material handling jobs. It has the maneuverability to handle work indoors plus the capacity to increase production and cut cycle time on many loading and maintenance jobs outdoors.

TL-11

CAPACITY: 0.86 M³ (1⅛ CU YD)
ENGINE GASOLINE: 63 BRAKE HP
DIESEL: 77 BRAKE HP
WEIGHT: 5125 KG (11,300 LB) GASOLINE
5220 KG (11,500 LB) DIESEL

Here's a rugged Tracto-Loader with the maneuverability of 2-wheel drive and the strength of 4-wheel drive. It combines strong construction with flexibility for top performance on tough material handling jobs.

TL-12

CAPACITY: 0.86M³ (1⅛ CU YD)
ENGINE GASOLINE: 63 BRAKE HP
DIESEL: 77 BRAKE HP
WEIGHT: 5490 KG (12,100 LB) GASOLINE
5580 KG (12,300 LB) DIESEL

This heavy-duty, 4-wheel drive loader combines ruggedness and ease of handling to speed a wide variety of excavating and loading jobs. It digs and loads hard-packed materials, saves time on all cycles. It is built for long, dependable service.

Consult the Allis-Chalmers construction machinery dealer in your area. Let him help you select the proper size of Tracto-Loader for your particular needs.

ALLIS-CHALMERS, EXPORT DEPARTMENT MD1057, TRACTOR DIVISION, MILWAUKEE 1, U.S.A.

ALLIS-CHALMERS

BUILDERS OF MACHINERY SINCE 1847

MORE STEEL

Millions of additional tons from Bethlehem plants

So that more steel will be available to the industries of the world, Bethlehem is rapidly expanding the capacities of its plants in the United States of America.

For example, the great Sparrows Point Plant (world's largest on tidewater) will soon have an annual capacity greater by 2,000,000 tons than it had a few years ago. From this plant, in the Port of Baltimore, products for export distribution can be loaded directly on board ship.

Increased production means that greater quantities of steel products will be available for the export markets. In addition, it means that Bethlehem's friendly offices and representatives throughout the world will be able to serve you better and more promptly than ever before. Bethlehem Steel Export Corporation, 25 Broadway, New York 4, U.S.A. Cables: "BETHLEHEM, NEWYORK."

Bethlehem supplies steel to world markets in all forms, including

BARS ★ ALLOY STEELS ★ TOOL STEELS
PLATES ★ STRUCTURAL SHAPES
SHEETS ★ STRIP ★ TIN PLATE ★ PIPE
WIRE PRODUCTS ★ RODS ★ RAILS

★ BETHLEHEM STEEL ★

Represented in all principal cities of the world by offices and representatives of Bethlehem Steel Export Company.

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McGRAW-HILL INTERNATIONAL

OCTOBER 1957
VOL. 12 NO. 10

Management Digest.

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NEW YORK CITY
OCTOBER 1957

Keeping Pace with Population

A manager's most difficult problem is to "see the forest for the trees"—to understand the whole of an enterprise, present and future, when so many day-to-day details obstruct his view.

So it is with the world. Preoccupied with the immediate—tight money, "containing" Communism, governing Algeria—men tend to neglect the truly fundamental problems. And here we would like to nominate as the most profound, "root" trend of the times the incredibly rapid growth of world population over the past 100 years (page 15). The impact of this "population explosion" will be felt when tight money, Algeria, even the Communists are all but forgotten.

Intimately related to population growth is another trend that had its beginnings in the 19th Century: The advance of modern technology throughout the world. The two feed each other. More people stimulate technological innovation; and innovation has lengthened life and encouraged the birth rate.

An optimist is apt to put his faith in technology: Surely the scientists will be able to moderate the effect of the population explosion. The pessimist is convinced that all the world's economic gains are in imminent danger of being swallowed up by new, hungry hordes.

Both seem wide of the mark. Doom is probably not imminent. On the other hand, the scientists will not easily and painlessly cope with thousands of millions more mouths to feed. And while we have an idea that man will somehow "muddle" through—adapting himself to his environment, and the environment to his needs—there is no doubt that surging population will create strains, upsets, and trouble for the world over the next 100 years.

What has this to do with the business manager? Simply that the population revolution forces him to organize the factors of production so as to make the best use of the world's resources. He must innovate, he must produce more, and see to it that his output is distributed as widely as possible at the lowest possible price. The managerial revolution must keep pace with the population revolution.

The Entrepreneurs

There is an "air" about Sao Paulo, Brazil. It is an air of business, of building and getting things done—something the experts say is essential to economic growth. All the international loans, the advice of economists, and the projects of government planners come to little if a community has not caught the spirit of entrepreneurship.

The Paulistas have that spirit—and you can see, in the article on page 18, a bit of what they are accomplishing. Sao Paulo is today the workshop of Brazil; and Paulistas insist it will one day be the workshop of South America.

Management Digest has a special, personal interest in Sao Paulo. For in that city and the surrounding industrial area is the largest single concentration of Management Digest readers in the world.

We will not be so presumptuous (and absurd) to link this magazine and Sao Paulo's business growth in a cause-and-effect relationship. But, just the same, we cannot resist the observation that where management men are at work, so is Management Digest.

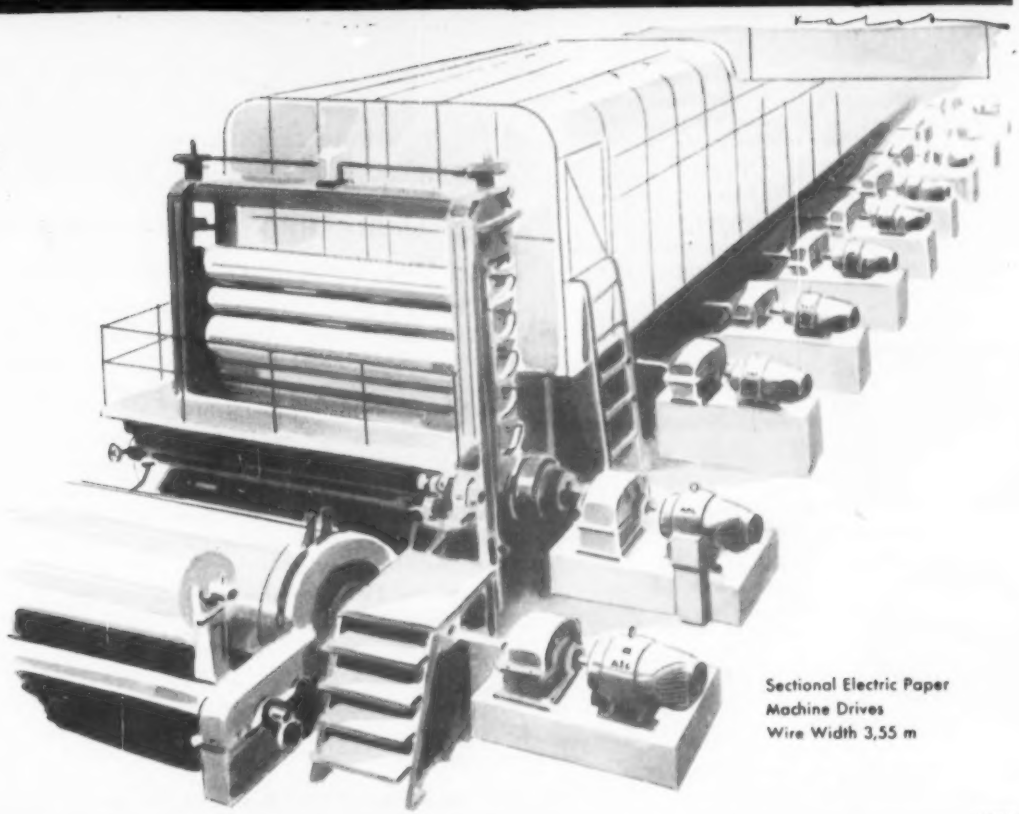
Paul R. Miller, jr

AEG

Electrical Equipment for the Paper Industry

Only well designed electric drives coupled with accurate regulation enable the paper industry to cope with ever increasing demands.

Extensive work by the AEG in this field helped to increase production and economy with added safety.



Sectional Electric Paper Machine Drives
Wire Width 3,55 m

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ALLGEMEINE ELEKTRICITÄTS-GESELLSCHAFT

Berlin (West) EXPORT DEPARTMENT Frankfurt (Main)

There IS a Big Difference in Saw Blade

Try DoALL *CLAW-TOOTH* on Your Next Job!

How the CLAW-TOOTH blade reduces contour or cut-off *sawing costs* . . .

CUTS ALL MATERIALS—Steel, titanium, brass, iron, asbestos, plastics, wood, rubber and many other metals and non-metallics.

EXTRA FAST CUTTING—The claw-like, positive rake angle teeth literally "pull themselves" into the work—providing more penetrating power and smoother chip flow.

EXTRA LONG LIFE—Made sharp to *stay* sharp—scientifically designed tooth and gullet shape gives you longer blade life. Teeth are securely anchored to the flexible back to take heavy cutting loads without breakage.

EXTRA EASY CUTTING—Its "bite-in" cutting efficiency requires less feed pressure, resulting in more output with less work per operator.

ACCURACY OF SET ± .002"—Only DoALL *guarantees* this set accuracy. It means you get straight, accurate cutting of virtually any material . . . freedom from binding . . . ability to produce a predetermined kerf size and surface finish.

CLEAN, BURRLESS CUTTING—Means less finishing and grinding costs.

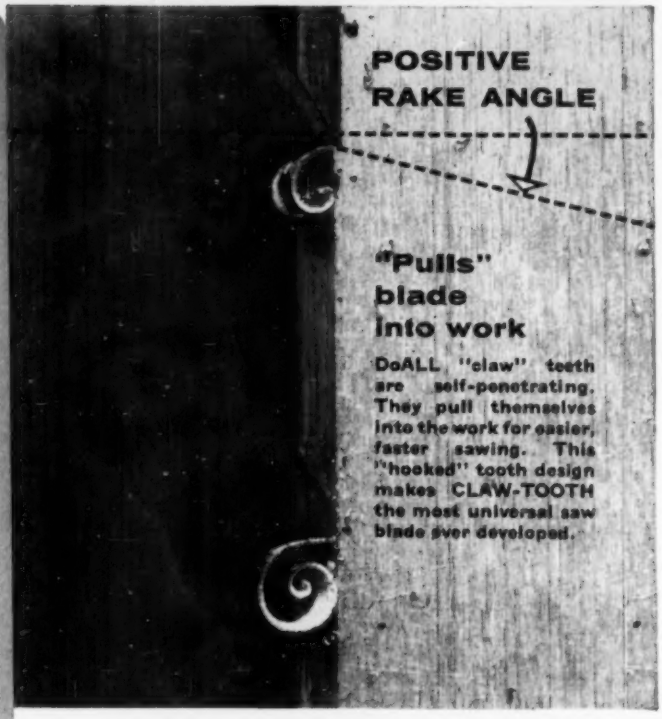
GUARANTEED UNCONDITIONALLY—to be completely free of defects in material, workmanship, heat treating and packaging.

Convenient "strip-out" Containers —

100' or 500' coils in exclusive DoALL "strip-out" boxes for convenience, safety and blade protection.

Custom Welded Lengths —

to fit any band sawing machine. Individual packages or cartons of six packaged blades.


POSITIVE
RAKE ANGLE
"Pulls"
blade
into work
DoALL "claw" teeth are self-penetrating. They pull themselves into the work for easier, faster sawing. This "hooked" tooth design makes CLAW-TOOTH the most universal saw blade ever developed.

Available in CARBON or HIGH-SPEED STEEL

They'll saw faster on any machine!

There's a DoALL saw band for every machine and job . . . but the blade that handles *more* jobs *better* is the CLAW-TOOTH! For cut-off jobs or contour sawing, the versatile CLAW-TOOTH blade can reduce both your sawing costs and blade inventory.

Available in ¼" to 1" blade width—2, 3, 4, and 6-pitch. For lowest cost per square inch of cutting, specify DoALL CLAW-TOOTH. Or, if you have a special sawing problem, ask about DoALL's free blade selection service—complete recommendations will be furnished for your job.

Send for FREE catalog of complete line of DoALL band tools.

DoALL

Visit our Booth No. 360 . . . Metals Show, Chicago, November 4-8

WRITE FOR LITERATURE on DoALL Contourmatic or Cut-off Machines and for catalog on 18 types of DoALL saw bands in 300 width-pitch-type combinations.

SB-58X

DoALL—Manufacturers of Band Machines and Blades . . . they go together.

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The DoALL Company
Des Plaines, Illinois

DoALL is the world's largest manufacturer of band machines and blades . . . producing a full line of both contour and cut-off power saws as well as saw bands to fit every purpose . . . every purse.

▶ WORLD TRENDS

THE U.S.A.: BUSINESS AT HOME . . .

August and early September brought worry about the business outlook in the U.S.A. You saw it in an uneasy stock market, and in the talk of over-capacity, slimmer profits, declining prices for some raw materials.

But a drastic down-turn, or recession, is not at all likely. Great strength underlies the economy. What you are seeing is "rolling readjustment," where first one, then another sector of industry is affected.

Looking ahead: A growing number of Americans believe U. S. business is entering a new phase that may last for several years. They call it the "Period between Booms," or "The Time of Transition."

This means, simply, that the factors that produced the "super-powered" boom of the past 10 years have moderated. Ahead is a time of increased competition, less rapid capital investment, heavier pressure on profits. But no one doubts that "normal" growth will continue, and that basic forecasts for a $550,000-million to $600,000-million economy in 1965 will be realized.

Says one economist: "You do not reach targets on a straight-line projection."

. . . AND BUSINESS ABROAD

A "time of transition" may be at hand for the U.S.A.'s foreign trade and payments as well.

Washington analysts explain it this way: The "dollar gap," the difference between what foreign nations spend and what they earn in dollar transactions, seems to be appearing again. You see it in the figures on foreign exchange reserves. They rose steadily from 1952 until late 1956; they have been dropping since. And latest U. S. trade figures indicate the trend may be more than temporary: For the year ending in June, U. S. exports rose 23%, imports, 4%. And in first-half 1957, exports rose 22%, imports only 2%.

That kind of dollar drain, if it continues, threatens the stability of trade with the dollar area, and could disrupt world commerce generally. Many nations might have to put stiff controls on dollar-area goods.

The "new" dollar problem is widespread. Except for Germany and Switzerland, almost every European nation feels the pinch. India's reserves have dropped sharply; Japan's balance of payments is under a strain. In Latin America, Peru and Chile are noting a fall in non-ferrous metals revenues; Brazil maintains an uneasy balance only through rigid import curbs; even Mexico may have trouble maintaining its usual surpluses.

Meanwhile, the U.S.A.'s performance in the field of trade policy is not encouraging.

Renewal of the Reciprocal Trade Agreements Act by Congress in 1958 is by no means certain; approval of U. S. membership in the Organization for Trade Cooperation is unlikely. There is a drive for import quotas on many products, from farm goods to metals.

The Eisenhower Administration seems to be giving ground right now. It is backing higher tariffs on lead and zinc, and may accept some curbs on oil imports.

The danger of weakening U. S. leadership in trade matters is not that

Turn the page for more WORLD TRENDS

new, prohibitive U.S. tariffs will be suddenly flung up. They won't. Nonetheless, a leadership "vacuum" is bound to stimulate protectionist sentiment everywhere, and encourage those who want the embryo European Common Market (and future Latin American regional trade systems) to adapt rigid restrictions.

The brightest spot in the outlook is the dramatic growth of U.S. private investment overseas. It is now a major source of dollars for foreign nations, and will not be immediately affected by today's payments troubles.

In 1956, U.S. private investment rose by a record $3,900-million; this year may see that record shattered again. While petroleum operations still account for almost half of the total, manufacturing investment is increasing much faster. (Canada, as usual, is getting the largest share, with Latin America second and Europe a very close third.)

Note these two aspects of the Yankee foreign investment boom:

1. It occurs despite persistently heavy demands for capital at home in the U.S.A. Businessmen are actively seeking overseas opportunities, and are responding to the efforts of many nations to improve the climate for private investment.

2. An estimated 33% of last year's increase in U.S. imports of merchandise came from foreign affiliates of U.S. companies.

This increasing concern with foreign operations should encourage American businessmen to demand—more loudly than they have—liberal trade policies in Washington.

Finally, there is no cause for deep gloom about the long-run world trade outlook—despite occasional balance of payments problems. Growth should continue indefinitely, supported everywhere by the insatiable demand for full employment, higher wages, faster economic development.

THE MARCH OF BUSINESS

Expansion, diversification, new plans and projects—on a world scale—are the order of the day. Here are some significant examples:

Having extended its venture capital operations from Latin America to Europe (MD, July p 16), the Rockefeller brothers' **International Basic Economy Corp.** has turned up in Asia. IBEC bought control of a development and export-import firm in Thailand . . . **United Fruit Co.,** the huge Central American banana-grower, is diversifying into petroleum exploration in Panama . . . **Imperial Chemical Industries Ltd.** is launching an intensive—and expensive—campaign to at least double exports of its Terylene synthetic fiber.

You will see more of this: American firms seeking overseas licensees, then purchasing an interest in the licensee. **Clark Equipment Co.,** the U.S. materials-handling equipment maker, just bought a 30% interest in its German licensee, then turned around to acquire a third share of a British manufacturer who will make Clark products under license . . . **Yankee suppliers and manufacturers of oil-field equipment** are searching everywhere for foreign licensees, manufacturing and sales affiliates.

A German steel merger is likely, linking **August Thyssen-Huette** and **Phoenix-Rheinrohr.** The marriage would have assets of over $600-million, steel capacity of 5-million tons—the biggest combine in the Ruhr. . . . An important Latin American power financing deal has been concluded. **American & Foreign Power Co.** will get $52-million from the U.S. government's Export-Import Bank and the Metropolitan Life Insurance Co. The money will help pay for 610,000 new kilowatts of power in Cuba, Colombia, Costa Rica, Ecuador, Guatemala, Panama, and Venezuela.

Announcing increased capacity ratings for

TIMKEN *Made in* U.S.A.

TRADE-MARK ORIGINATED, OWNED, REGISTERED BY THE TIMKEN ROLLER BEARING COMPANY

TAPERED ROLLER BEARINGS

THE Timken Roller Bearing Company announces an increase in the capacity ratings of most series of Timken made-in-U.S.A. tapered roller bearings. Increases range up to 39%. Most are about 10%. Some are negligible.

Permits Use of Smaller Bearings

This increase in capacity ratings makes it possible for many of you to use smaller bearings. Your products can be made more compact. You can save weight. You may be able to reduce the size of your shafts and housings. And you may be able to use Timken bearings in new applications where they have not been practicable in the past.

3 Reasons for Increases

What led to these increases in Timken bearing capacities? Three things:

First, a careful review of more than 6,000 different laboratory studies of Timken bearing performance on fatigue-life machines. From these exhaustive studies, conducted on an organized, scientific basis since 1924, we keep learning more and more about predicting bearing life.

Second, refinement in the method of analyzing these studies mathematically.

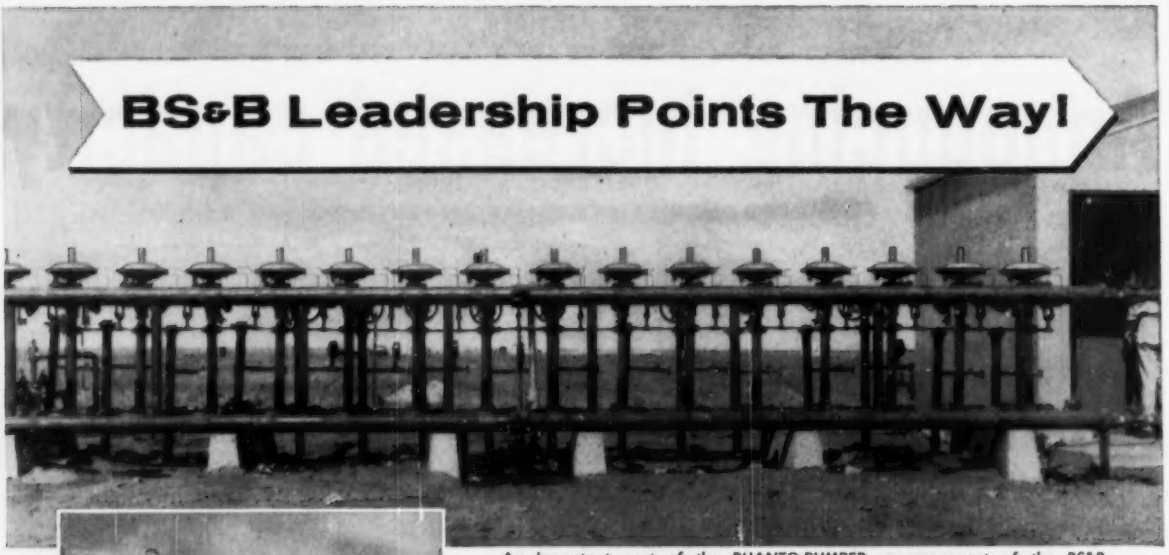
Third, a careful review of the life of millions of Timken bearings in the field.

How Much Can This Save *You?*

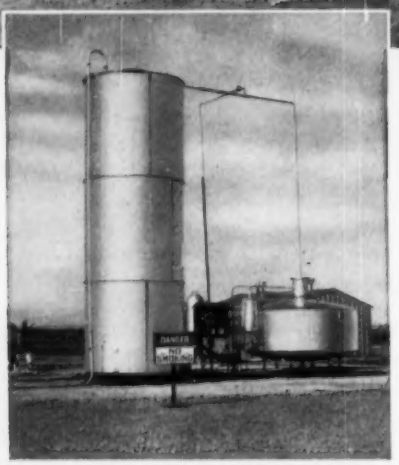
To find out how the new capacity ratings affect the types and sizes of Timken bearings in which you are interested, call your Timken bearing representative or write our Engineering Department. We'll be glad to work with you at the drawing board stage. The Timken Roller Bearing Company, Canton, Ohio, U.S.A. Cable address: "TIMROSCO".

NOT JUST A BALL NOT JUST A ROLLER THE TIMKEN TAPERED ROLLER BEARING TAKES RADIAL AND THRUST LOADS OR ANY COMBINATION

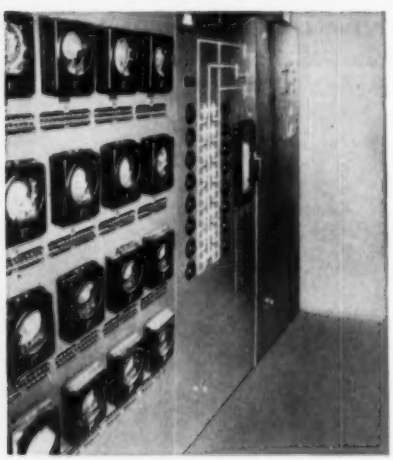
BS&B Leadership Points The Way!



An important part of the PHANTO-PUMPER, a component of the BS&B PHANTO-MATIC Lease System, is this well test and well flow control manifold.



That part of the BS&B PHANTO-MATIC Lease System which measures, records and automatically runs lease-produced oil on an unattended basis into a connecting pipeline (in accordance with predetermined schedules) is known as the PHANTO-GAGER.



Nerve center for all automatic operations of the PHANTO-PUMPER is this central control panel.

Now BS&B Phanto-Matic Lease Systems Put Oil Production On A Fully Automated Basis!

Throughout its nearly 65 years of service to the oil industry, BS&B has pioneered and developed many new types of oilfield equipment to enable lease operators to do a better production job at a lower operating cost.

In recent years, however, BS&B has greatly *accelerated* its research and development program to bring out many new oilfield equipment items and fully integrated oilfield systems.

One of these is the BS&B PHANTO-MATIC Lease System which, through fully automatic operation of all lease equipment from the wellhead to the pipeline, offers oil producers greater accuracy, elimination of routine manual procedures on the lease site, greater efficiency in all phases of operation and substantial savings on operating expense.

Why not join now with the thousands of oil producers all over the world who say, "If it's made by BS&B, it's all right for me!"

Your BS&B Representative will gladly give you full information on any item of BS&B oilfield equipment—or you may write to . . .

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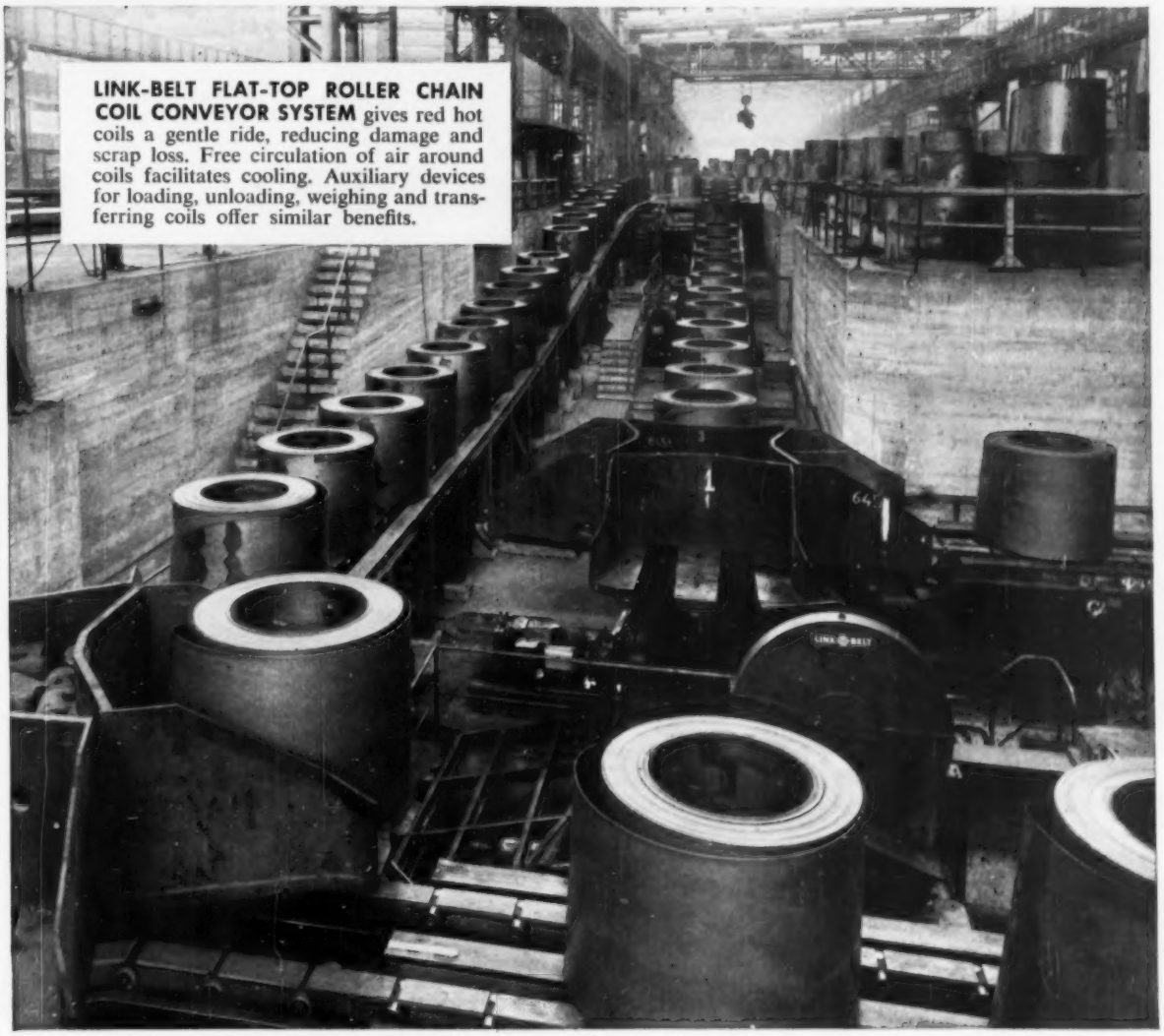
Uncommon carriers for steel's unique demands



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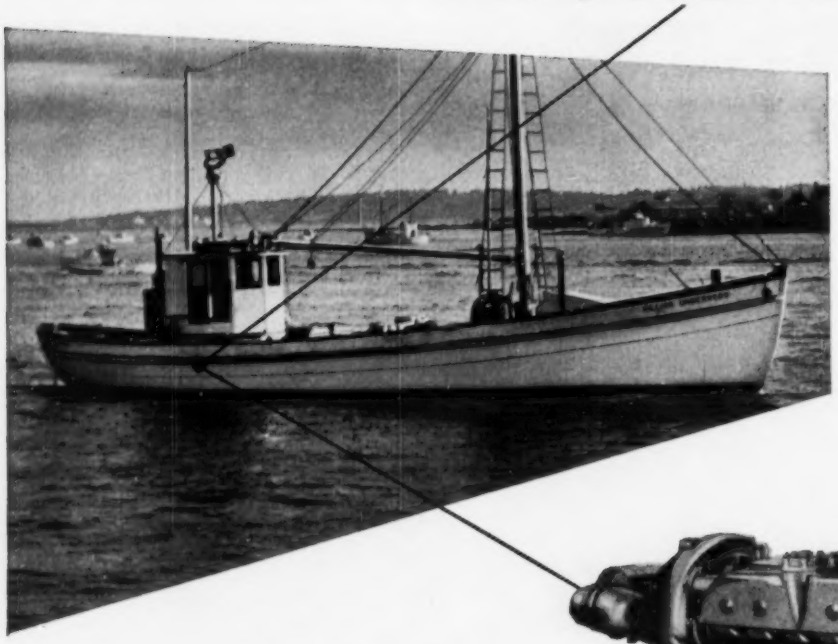
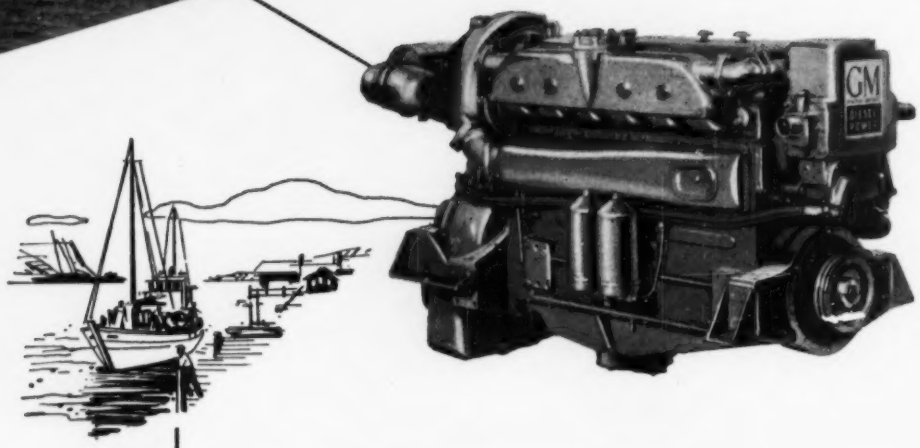
LINK-BELT MULTI-STRAND CHAIN CONVEYORS cool pipe (shown), handle hot slabs, billets, sheets, plate and other products between and through processing operations.

The power of economy





GM Diesels are preferred by experienced boat owners—for boats of all kinds and sizes. They make maneuvering easier, respond readily to simplified controls, and vibrate less. Since they don't rely on spark ignition, GM Diesels perform dependably even in bad weather. Most remarkable of all, though, is their economy!

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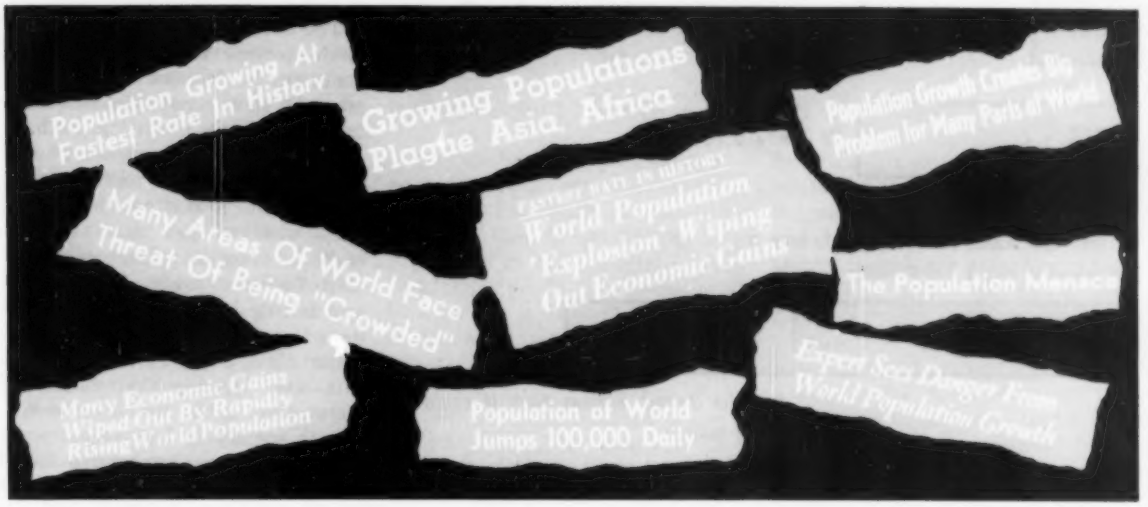

Population Growing At Fastest Rate In History
Growing Populations Plague Asia, Africa
Population Growth Creates Big Problem for Many Parts of World
Many Areas Of World Face Threat Of Being "Crowded"
World Population 'Explosion' Wiping Out Economic Gains
The Population Menace
Many Economic Gains Wiped Out By Rapidly Rising World Population
Population of World Jumps 100,000 Daily
Expert Sees Danger From World Population Growth

Facing a Population Explosion

Will the human "chain reaction" bring lower living standards and chaos? Or can it be controlled? A businessman's appraisal.

"The more babies the better" was almost an article of faith among Chinese Communists—until Chairman Mao Tse-tung issued a warning earlier this year:

Thirty-million Chinese births a year, Mao declared, is a matter of "great concern . . . The increase in the grain harvest has been barely sufficient to cover the needs of our growing population . . . Steps must be taken to keep our population at a stable level."

Steps are being taken. Chinese women may now get abortions and sterilization on request; output of contraceptives is to be expanded; there is talk of raising the legal marriage age.

Mao's pronouncement was one more reflection of the world's increasing concern with population growth—and its effect on economic development. A few months ago, publication of the United Nations' 1956 *Demographic Yearbook* added new statistics to the discussion. Human beings are reproducing at an unprecedented rate, reports the U. N. A mixture of high birth rates and fast-dropping mortality has produced a population "explosion" that could populate Turkey and the Philippines in one year; produce the equivalent of a new India in eight years; double the human race by 2000.

With these statistics has come a new outburst of questioning, argument, gloomy predictions—including "scare" headlines like the ones above. Businessmen and governments, as well as scientists, have come to realize that the demographic "revolution" will dominate the world for generations to come (page 4).

I. Demographic Fact & Fancy

There were probably less than 500-million people in the world in 1500; in most areas population was stagnant. But by the late 17th and early 18th centuries, population began to grow. The rise was slow, and did not carry population to the 1,000-million mark until 1815.

In the 19th Century, the process gathered speed. Improved sanitation and disease control, better food supplies and transport began to take hold; while the birth rate fell, the death rate dropped much faster. By 1930, world population reached 2,000-million. In 100 years, mankind had increased by 1,000-million, while the three centuries before added only half that amount.

Yet the population "explosion" may be just getting started. In the 20 years between 1930 and 1950, the world added another 500-million. And today, population is probably increasing at the tremendous rate of a thousand million every 25 years.

The momentum is there, suggests the U. N. Where birth rates are high, they tend to go higher; where low, they tend to fall. But the "highs" have it now.

Perhaps the most significant aspect is the plummeting world mortality rate—something that shows up vividly in Middle and South America, fastest-growing areas in the world. In a little over a decade, the life exectancy of a Chilean male at birth has increased by 12 years.

Predicting future population growth, let alone life expectancy,

Why there is confusion on world population . . .

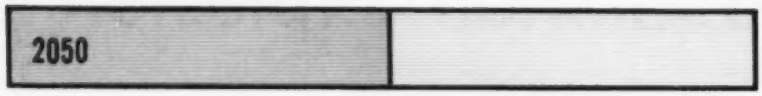
100 years ago, the world's population was not much more than 1,000-million.

It is now 2,700-million.

By the year 2000, some experts foresee a population of only 3,300-million.

But the United Nations says it could be 5,400-million.

Some demographers project 3,600-million in 2050, and an upper limit of 4,000-million that will hold for centuries.



Others make a "conservative" forecast for 2050 of 7,000-million.

has always been a difficult exercise. The experts usually end up many thousands of millions apart —and far below the mark.

In 1930, demographer Raymond Pearl decided a population limit would be reached in the 21st Century, at 2,000-million. In 1939, he raised the ceiling to 2,600-million —exactly the present population as reported by the U. N. Several years ago W. S. and E. S. Woytinsky forecast a population of 3,200-million by the year 2000 and 3,600-million by 2050, to level off later at 4,000-million. But at the present growth rate of 1.6% yearly, world population would reach 5,400-million by 2000.

This year, three American scientists made a "conservative" prediction: World population will rise to 7,000-million by 2050. They assume a rapid, widespread acceptance of birth control techniques. And they call their forecast "conservative" because without that acceptance, the increase may be "much greater."

The problem, of course, is how you make a population prediction. Historical methods (treating population as an aspect of cultural development), mathematical formulae and statistical projections, applying strictly economic, social, or religious factors—none of these has worked well.

The U. S. A. provides a classic example of demographic myopia. Through the 1930s and on into the 1940s, most demographers assumed that the industrialized North American population had stabilized, and would grow much less rapidly. Yet hardly a decade later, the experts were confounded by a North American population that has erupted into one of the fastest-growing in the world—as fast as Southeast Asia, faster than teeming South Central Asia.

North America gets its growth in a different way, to be sure. The birth rate is 25 per 1,000, the death rate is 9 per 1,000; South Central Asia's births run 41 per 1,000, deaths, 28. So the net rate of natural growth is 16 in North America against 13 in South Central Asia. You can argue that if Asia attains industrialization such as North America's, it would grow faster—not slower.

II. Progress—or Calamity?

The astounding crop of postwar babies seems wonderful to most American businessmen. Each birth means a new consumer, stimulating investment, profits, growth.

Just two decades ago, most businessmen in Western nations were worried that a vast population decline was coming; there seemed to be a cause-and-effect relationship between lower birth rates and falling national income. Gunnar Myrdal, the Swedish economist (MD, Sept. 1956, p11) took this line, arguing that declining population dries up investment, causes society to lose vigor.

His case was impressive to a world worrying about economic stagnation and war. Many governments hurried to stimulate the birth rate with housing subsidies and family allowances. And today, many argue that the postwar boom in population and income confirm Myrdal's position.

This argument, which appears to fit the North American experience, is disputed, certainly in the less industralized nations wrestling with surging population. When population doubles in such a land, the traditional social and economic structure is severely strained, and may break down completely. And each small increase in production is immediately eaten up by new millions, living at a bare subsistence level.

Now, the new element in the situation is that some important American experts are beginning to think along similar lines. Here are their points:

—Population growth does create the need for more investment, but it does not necessarily create an effective demand. More people in China or India, for instance, may need more housing. But what they may effectively demand is more mud huts or space on city streets. Even in the U. S. A., more people effectively demand more housing —but at the expense of the kind of investment that would raise per capita output and income.

—A growing population reduces the relative size of the age group that actually produces income, and

increases the age groups that must be supported—the children and old people. This places a double burden on the working people "in the middle" and may be a potent inflationary factor.

—Population growth presses hard against certain resources, depressing income. It is already taxing the U. S. A.'s water supply, and breeding congestion problems that can only be remedied by huge capital expenditures.

—A rising population is no guarantee against depression. Nor is a rising birth rate essential to full employment. That, the argument goes, depends more on fiscal and monetary policies, and on continuing technological growth.

Most men would agree with some of these propositions. Birth and death rates are out of step in many nations.

Yet the impact of what some worried observers call the "Population Bomb" has not come. Imminent famine and calamity, predicted in 1800 by T. R. Malthus and echoed by some of his 20th Century disciples, has been contained—and the danger has even retreated in recent years.

Malthus, first of the population economists, was wrong in 1800 because he regarded resources as fixed—and not, as they really are, a function of changing technology. Today, many of the "anti-population" arguments seem to neglect the role of fast-changing technology. The promise that nuclear energy will make resources go farther—and even create "new" resources—is an example.

The key to both riddles—how fast will population grow, and whether that growth is good or evil—is tied closely to technology: Can technological progress keep resources growing faster than population? Only time will tell. But note the humanistic hope of demographers like the Woytinskys. They bet on eventual population stability, because they believe man will go on demonstrating his "superior capacity to adapt himself to the environment and to adapt the environment to his needs." ●

Digested from The Demographic Yearbook, United Nations, 1956; The Economist, June 1,p764; Harvard Business Review, July-August,p19; Business Week, July 20,p83.

Which Markets in 1975?

Raw material needs of industrial areas will grow a lot in 20 years. The primary producers should plan—now—for larger markets.

Digested from THE ECONOMIST, Aug. 10, p 479

Are rapidly-developing nations—such as Brazil, or India—moving ahead so fast with industrialization that they are neglecting new investment in raw material production? That production is essential if a nation is to satisfy growing home needs and at the same time maintain an adequate export surplus.

There is some evidence of such neglect: Note the recent decline in the primary producers' share of world exports. If it is true, the primary producers may be unable to take advantage of larger future markets in older industrial areas, in Europe and the U. S. A. especially.

How much larger is the question. The latest forecast comes from the report of the General Agreement on Tariffs & Trade (GATT). Working from a number of economic growth studies, GATT economists have estimated the raw-material requirements of the great industrial consumers for the years 1973-1975:

Net Imports by North America & West Europe
(thousand million dollars)

	1953-1955	1973-1975
Fuels	$1.90	$4.80
Metals, ores	1.65	3.00
Natural fibers	1.95	1.55/ .75
Natural rubber	.70	.75
Other materials	1.15	1.90
Total	$7.35	$12.00/11.2

Overall, net imports for the two areas, tabulated above in terms of 1953-1955 prices, hold bright promise for fuels, metals, and ores, less bright for natural rubber and fibers. The dual estimates for fibers are based on alternate assumptions on the growth of synthetic fiber use in North America.

Here is a closer look, commodity by commodity:

An anticipated 250% rise in fuel imports during the twenty-year period is predicated on Europe's growing needs and the likelihood that its own output will increase more slowly. West European coal imports are expected to treble in volume; petroleum imports will treble in value, but rise somewhat less in quantity because a substantial part will be in the form of refined products.

The GATT forecasters do not expect North America to become more dependent on imported fuels. A rise of 100 or 140 million tons of petroleum imports by the U. S. A. will be partially offset by about 40 million tons of net exports from Canada. Coal exports from the U. S. to Western Europe —expected to be near 60 million tons in 1973-75—will leave North America's net imports of all fuels largely unchanged. The forecast assumes that nuclear power will not play an important part in total energy supplies by 1973-75, an assumption that is questioned by some authorities.

Net imports of the major non-ferrous metals into the two industrial areas are expected to rise by about 80%, a sharp increase in Western Europe more than offsetting a 20% drop in North America. Europe's net imports may be 2½ times larger than in 1953-55, imports of aluminum increasing by nine times and imports of other non-ferrous metals by about 75%. In North America, net imports of the common non-ferrous metals are expected to rise by only about 30%, while net exports of aluminum increase by over four times.

Consumption of textile fibers, both natural and synthetic, is expected to grow by 56%. The increase in North America is put at 67%; that in Western Europe, at 45%.

The debated question is how much of this market will be claimed by synthetics, and how much of it will be left to natural fibers. Gatt's experts suggest in

their report that the synthetics' share of the market will grow more slowly in the future and eventually stop.

In Western Europe, synthetic fibers are expected to account for one half of total consumption in 1973-75, compared to one-fifth in 1953-55. Alternative assumptions are made for North America: that the share of synthetics will rise from 35% to 67%, or that it will increase to no more than one-half. With the smaller increase of synthetics, consumption of natural fibers in the two areas would rise by $200-million; the higher figure would mean a decrease in the use of natural fibers by $600-million. The share of the market in natural fibers that will be left to the primary producing countries may well depend on the level of U.S. exports of raw cotton.

Exports of natural rubber in 1973-75 are expected to be determined more by the available supply than by the demand in the European and North American industrial complexes. In view of the needs of other countries, which are expected to double during the twenty-year period, only about 100,000 tons more rubber will be available to the two areas. The gap will have to be filled with synthetic rubber.

Import of foodstuffs that can not be produced by industrial areas—such as coffee, cocoa and tea—will rise sharply with increased incomes in the two areas. The report estimates that import of these products into Western Europe and North America will grow by 45% during the twenty years. Imports into North America will grow by $800 million to $2,600 million; Western Europe imports of the same foodstuffs will rise by $600 million to $2,000 million.

The GATT report can serve a useful purpose to countries producing all these basic raw materials. It may, *The Economist* suggests, lead governments to ask themselves two questions: Are they aware of the potential growth in demand for some of their basic commodities? Are they doing everything possible to insure that these demands will be met in the future? Past experience has not been too encouraging. ●

Sao Paulo is the workshop of Brazil, and now it aspires to an international role. The city is dynamic, one of the world's fastest-growing, with a devotion to business that you can see in the . . .

The Paulistas Set The

. . . new industrial buildings going up, new companies, new faces, and bustling congested traffic.

Pace for Latin American Business

THIS MONTH, as every month, will see a parade of business deals in Sao Paulo: A new international licensing agreement, the entry of a foreign firm into the city, a new metalworking plant, a major real estate transaction, tons of coffee bought and sold. Fortunes will be made, and lost.

This is the spirit of the city. Sao Paulo's driving impetus is business; the Paulista takes "os negocios" to heart with a passion —and with fierce pride.

—As for the rival, Rio de Janeiro, the Paulista will say "It is just a big government waiting room, with a beach outside."

—As for the nation's other states and cities, they are the "empty freight cars" that the proud Sao Paulo "engine" pulls.

Not only does Sao Paulo consider itself the dynamic producer of Brazil, but of all South America. Some day, say business men of Sao Paulo, this will be the "shopping center" of the continent.

In just a few years, Sao Paulo has entered the company of the great Western Hemisphere cities. Today it has over 3-million people, a million more than seven years ago, and is larger than Rio.

The city boasts nearly 23,000 factories and mills, employing about 500,000 workers. It produces 60% of the nation's textiles, chemicals, pharmaceuticals; 80% of the electrical materials and rubber goods. More than 85% of Brazil's 5,000 metalworking plants and shops are in Sao Paulo. Thanks to an "invasion" by foreign automotive manufacturers, the city has some 950 auto, truck and parts plants—and claims the title of Latin America's "Detroit."

Sao Paulo appears geographically off in a corner (see map). Yet it is in the economic heartland of Brazil, where the soil is rich and the climate mild. The city stands in the center of Brazil's largest consumer market; its hinterland produces half of Brazil's coffee crop. Further West and North stands the developing Brazilian "frontier," looking back to Sao Paulo for support and finance.

Santos, just 64 kilometers away, is now Brazil's leading port, and it gives the city an international outlook. Even though Brazil's expanding market is greedily buying up most of Sao Paulo's industrial production, Paulistas believe the day will come when their chemicals, machinery, railroad and other heavy equipment, consumer goods, even vehicles will be shipped around South America.

Already, Sao Paulo firms are exporting some special goods to neigh-

boring countries. If a "Common Market" ever appears in South America, the city's advantages will grow.

Foreign businessmen have been quick to see the advantages; new faces—European and North American—seem to appear each week. More than 300 U.S. corporations have affiliates in Sao Paulo. And of the estimated $1,200-million to $1,500-million direct U.S. investment in all Brazil, perhaps 75% is in the Sao Paulo area.

Foreign management men find Sao Paulo's business tempo fast—as fast as anywhere in the world. Most like it, and they appear to be making a strong contribution to the city. While large family groups still run many of the larger enterprises, the North Americans especially have helped promote the idea of broader ownership of business. They have spread the gospel of mass production, and have approached the city's problems with understanding.

One of the biggest problems—and it threatens Sao Paulo's future expansion—is traffic congestion and poor public transport. It will be costly to set right. Yet Paulistas have a spirit of civic responsibility, and are now studying plans for a rapid transit system and perimeter highways.

Rio de Janeiro is another Paulista problem; Sao Paulo's industrial growth depends on Rio's approval. Almost every business must consult the government before making a major move—and "commuting" managers can be found on the many daily Sao Paulo-Rio airplane flights. But while Rio is the city of bureaucratic delay and politics, it is so important that many Sao Paulo corporations have offices there—to serve the market, and to deal with the government.

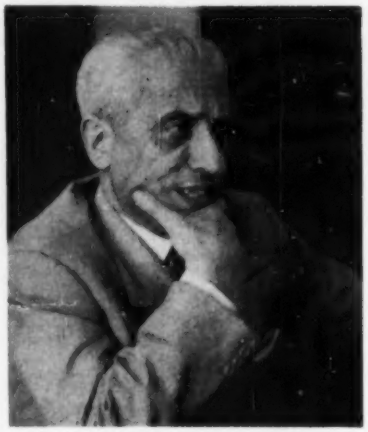
Some observers see Sao Paulo moving more into the national spotlight while Rio stands still. The transfer of the federal capital to Brasilia in the interior (map, page 18)—when and if it comes—may give Sao Paulo even greater prominence as a kind of unofficial "capital" as well as an industrial center. ●

Digested from American Machinist, July 1, p57, July 15, p176; Business Week, July 13, p58.

Management Men at Work

Valletta Bets on Growth

Digested from BUSINESS WEEK, July 27, p108



Valletta: "We have found that . . .

. . . the way to create production . . .

. . . is to create demand."

NEITHER Dr. Vittorio Valletta (left), chairman of Fiat, nor his company, Italy's largest corporation, has the reputation of being a gambler. Yet they have just embarked on two of the costliest ventures in Fiat history. The company is betting a lot of money—

—That it can win a large piece of the fast-growing American market for small cars.

—That its new tiny "500" model can become the new "people's car" of Europe.

Fiat has dominated Italy's auto market since 1899, now supplies about 80%. Valletta is convinced today that a mass consumer market is budding in Italy; his hope is to "graduate" the consumer from the motor scooter to a cheap car. And he believes he can promote the "500" (at a price equivalent of $784) throughout Europe.

Valletta has more to worry about than autos; about 25% of Fiat's business ($544-million in sales, 23% exported) is in tractors, trucks, buses, aircraft parts, steel, engines, appliances, atomic research. A college professor and time-study expert, Valletta joined Fiat in 1920, helped reorganize the company after World War I and became managing director as World War II ended. His first task was to rehabilitate the damaged, worn-out plants; his second was to deal with the Communists who began to dominate Fiat workers.

Valletta won. One of his proudest achievements has been reducing Communist influence to a minimum. Today, Fiat workers seem to support management strongly, enjoying high pay and many social benefits. Valletta sets great store by training—for everyone from youthful mechanics to the managers who attend a Turin business school, promoted by Valletta and patterned after the U.S.A.'s Harvard Graduate School of Business.

Valletta, at 74, thrives on problems. He and Fiat show few signs of slowing up. ●

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New Approach to Capital Financing

What is the best way to raise capital? To answer that, calculate the exact rate of return on all practical combinations of debt and shares.

Is debt financing less sound than equity financing?

To some extent, the debate is academic. Even those who despise debt are likely to borrow. Some try to get out of debt as soon as possible; others, constantly in debt, try to keep it within bounds.

But many businessmen shy away from debt for questionable reasons—even the mere thought that "what is borrowed must be repaid with interest."

Regardless of the interest rate, the only real criterion should be: Will borrowed capital substantially increase earnings—or the return to owners and common stockholders?

With this approach, there is no debate. The only problem is to determine how a particular loan will affect the return on capital. Now, a new way of doing this has been worked out by a U.S. business-school professor, Louis O. Foster of Dartmouth University.

By simply rearranging conventional financial statements, Professor Foster isolates all sources of capital and the net income available for 1) all capital suppliers, and 2) each class of supplier after the preceding class has received its share.

A little pencilwork reveals some significant information about the cost of capital and rate of return. Look at the example on the right:

1. Earning rate on total capital:
$$\frac{49{,}513}{617{,}636} = 8.0\%$$
2. For common stockholders:
$$\frac{41{,}932}{279{,}109} = 15\%$$

Apparently, the company's financing procedure raised the rate of return to common stockholders from 8% to 15%. Actually, however, the difference is even greater. Interest charges are figured as an expense and deducted from income tax. If the interest charges were figured as income, 56.6% (the tax rate paid by the company) would go to the tax collector. Thus the income available for all capital suppliers would be reduced to $46,861,000, and the rate on all capital to 7.6%.

Now look at it from another angle. How much would the stockholders have earned by supplying the capital raised by debt and preferred stock—an additional investment of $267,655,000?

Additional common-shareholder earnings would be $4,929,000 ($46,861,000—as above—less present earnings of $41,932,000).

The return figures out to be 1.8%—which doesn't compare very favorably with the 15% earning rate. It seems, therefore, that debt financing was a wise and profitable procedure in this case.

Prof. Foster turns up further evidence by comparing companies with different capital structures. The U.S.A.'s Republic Steel Co. is a "conservative" company with a high proportion of common-share equity; Pittsburgh Steel is a "venturesome" company with a greater proportion of debt. By "refinancing" Republic with the same proportion of debt as Pittsburgh carries, the Professor—on paper—raised the rate of return (in 1955) to common shareholders from 13.8% to 22.3%.

However, Prof. Foster is not unaware of the risk involved in debt, and he can prove this point too. Steel profits were low in 1954, and Pittsburgh earned 0.9% on common-share equity. But if

To calculate return on capital . . . . . rearrange financial statements this way:

(figures for R. J. Reynolds Tobacco Co., 1954)

Balance Sheet

Total assets		**$617,636,000**
Sources of assets		
Non-cost	$70,872,000	
Interest cost	194,000,000	
Prior-dividend cost	73,655,000	
Common-share equity	279,109,000	**$617,636,000**

Earnings Statement

Total revenues		**$814,276,000**
Less:		
Cost of goods sold	$701,646,000	
Depreciation	3,412,000	
Provision for profit participation	1,188,000	
Provision for income tax	58,517,000	764,763,000
Available for all capital suppliers		**$49,513,000**
Interest and debt expense		**4,685,000**
Available for all stockholders		**44,827,000**
Preferred dividends		**2,895,000**
Available for common shareholders		**$41,932,000**

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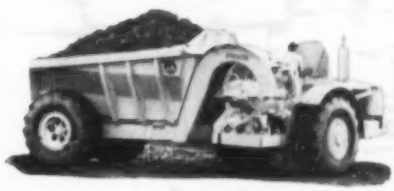

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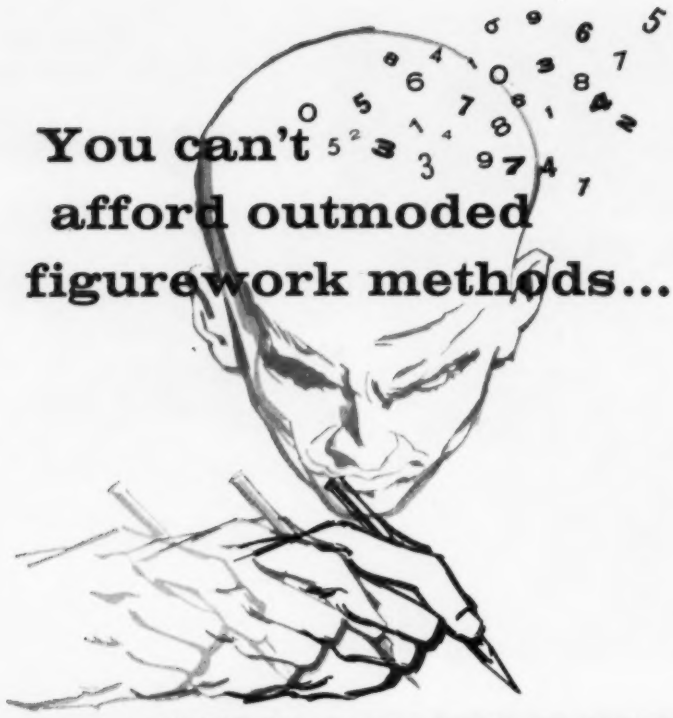

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common shareholders had supplied all the non-cost capital, Foster figures the earning rate would have been 1.9%. "Debt is expensive to the common stockholder" he points out, "unless a corporation's earning rate is high enough to cover fixed financing charges."

How can the Professor's calculations be used by a company facing a problem in financing?

Assume that X Corp. has decided to expand. Currently its assets total $55,000, of which $5,000 is from non-cost sources and the rest from common-share equity. It is estimated that, after expansion, annual before-tax earnings will be $25,000. The additional capital needed is $45,000.

To decide between alternative plans, draw up earnings statements for each. Take these two:

Plan A: Selling common-share equities for $45,000:

Total revenues	$200,000
Cost and expenses	
Employees	$82,000
Materials	88,000
Depreciation	5,000
Tax	13,000
Net Income	$12,000

Plan B: Floating a $15,000 loan at 4% and issuing $30,000 preferred stock at 5%:

Total revenues	$200,000
Cost and Expenses	
Employees	$82,000
Materials	88,000
Depreciation	5,000
Tax	12,688
Available for all capital suppliers	12,312
Less Interest	600
Available for all stockholders	11,712
Less: preferred dividends	1,500
Available for common shareholders	$10,212

Comparative returns:

	Plan A	Plan B
Rate on all capital	12.00%	12.31%
Rate on all but non-cost	12.53	12.96
Rate for all stockholders	12.53	14.64
Rate for common stockholders	12.53	20.42

Another factor: How much would the stockholders be earning on the additional investment under Plan A? The difference in income is $12,000 – $10,212 or $1,788 on the $45,000 investment. This figures out to 3.91%.

Weighing this evidence, it remains for management to decide. ●

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63 hp — gasoline; 5,490 kg (12,100 lb)
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Clutch-Type Transmission.

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▶ FINANCIAL DIGEST

Europe's present currency problems are worrisome symptoms—of a dangerous inflationary bias, and of deep-seated imbalances that could plague the area for years.

At best, Europe's exchange system will have more jolts, including a full devaluation of the French franc. At worst, there could be wholesale devaluations, and a new network of import restrictions. None of it bodes well for the infant Common Market and Free Trade Area plans.

The chief "offenders" ((depending on which side of the Rhine you live) are the Deutsche Mark and the French franc. The "overvalued" franc has undergone a partial devaluation. The "undervalued" mark, backed by a growing treasure of reserves, refuses to budge.

The Germans say they will not revalue the mark. But they have been embarrassed by the "flight to the mark," and have taken several steps that may reduce the flow slightly.

Further measures may be coming, including (1) transfer of some of Germany's reserves to a special capital fund for overseas development; (2) removal of all import restrictions, and (3) a speed-up in payments of Germany's international obligations.

One possibility: Britain (who refuses to tinker with the pound), Germany (adamant against up-valuing the mark), and other European nations may agree to allow exchange rates to float within a wider margin than 1½%. That might be difficult for traders, but would curb speculation.

●

Canadians have had a lot of experience with a "floating" exchange rate. Their dollar just reached a towering 6% premium over U. S. currency. And while it dropped off a bit as Management Digest went to press, many observers expect to see a substantial premium for years.

Certainly there were no signs that the Bank of Canada or the new government of Prime Minister Diefenbaker were about to take strong action to reduce the premium.

Meanwhile, demand for Canadian dollars remains strong. The flow of U. S. private capital north of the border continues heavy, and the Yankee dollars are being joined by larger British and European investments in Canada.

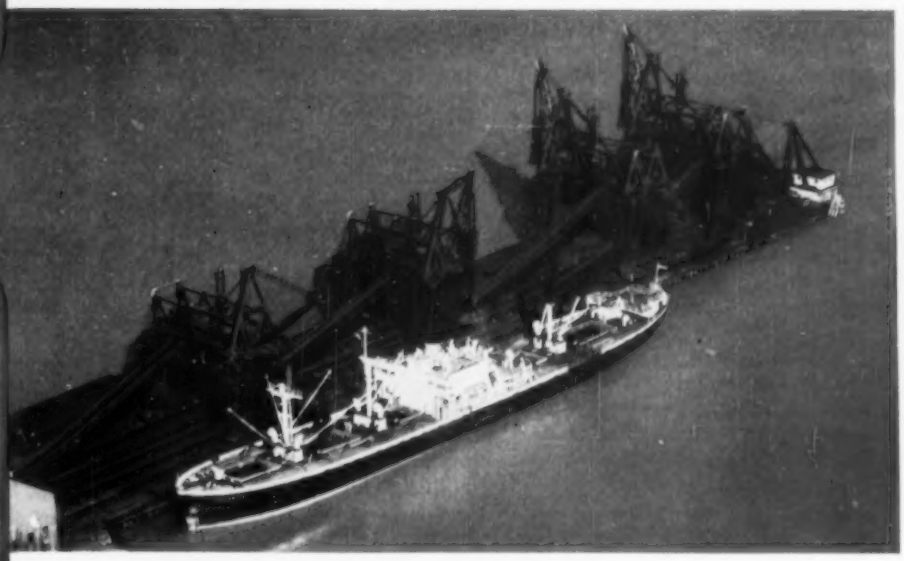
●

Note the contrast between the first and second loans of the International Finance Corp., the year-old offspring of the World Bank. The contrast is deliberate.

Loan Number One went to the giant Siemens organization of Germany, to help expand its Brazilian facilities. Now the second goes to Engranes y Productos Industriales, a small Mexican manufacturer (auto parts, other industrial components) built up over the past four years by a young American with Mexican and U. S. stockholders. The $600,000 loan is in the form of 10-year notes, half in dollars, half in pesos, bearing interest at 7% yearly.

Commenting on the Mexican loan, IFC President Robert Garner re-emphasized what he told Management Digest earlier (MD, Jan., p15): Above all, IFC is looking for skilled management and a spirit of enterprise—in large, medium, or small companies, in a wide variety of productive industrial businesses.

B&O LINKS BITUMINOUS BOUNTY WITH OVERSEAS MARKETS



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BITUMINOUS COALS FOR EVERY PURPOSE

How Management Can Pay the Machinery Bill

Digested from FACTORY MANAGEMENT & MAINTENANCE, July, p133

Management's problems grow by leaps and bounds in a world of fast-changing technology, increasing competition, and inflation. And not the least of the persistent managerial headaches involves the production plant: Where to find the money to buy needed new machines, and when to buy them.

Many a financial executive, accountant, engineer, and managing director has spent a great deal of time trying to solve this puzzle. There are many plans and formulas (MD—Sept, '56, p17; April, '57, p19). One that seems to have worked out well has been developed—and tested—by American Pulley Co., Philadelphia, Pa.

In less than 10 years, American Pulley has replaced half of its production and auxiliary equipment. How this is done is described on the right. Why it was done dates back to 1946:

Soon after the war ended American Pulley—like many companies around the world—woke up to this disturbing fact: A high proportion of its production machinery was out of date, and more was becoming obsolete each year. Worse, a survey indicated prices had risen 10 to 15 times over the cost basis of the machinery. Under rigid U. S. depreciation laws, the company would have to put up the excess costs—amounting to $316,000 in the next five years.

In the future, the problem would become even greater. Looking ahead, American Pulley saw it would have a fearful problem of financing equipment replacement by 1950.

The only answer was to fall back on a fundamental principle of accounting: To keep an enterprise flourishing and efficient, management must include in the selling price an adequate provision for replacing equipment.

Keeping books on a replacement-cost basis went against the accepted practice of accountants and tax experts. But, convinced of the need, American Pulley adopted the bookkeeping system.

To provide the money needed for excess replacement costs, management attached a charge to the cost of sales, month by month, beginning with 1% of net sales. The money was put into a special capital-asset replacement fund. (Since the charge could not be deducted for tax purposes, it, in effect, came out of the net income after taxes.)

Management let the fund accumulate for five years. Then in 1952, the fund was drawn on for the first time—but replenished with a continuing charge to the cost of sales. Now the fund is much like an annuity, with part of the $500,000 reserve invested in bonds.

Fund assets are carried on the balance sheet as a non-current item directly above "Property, Plant, and Equipment." On the liability side, the replacement fund is included in a comprehensive item called "Reserve for Future Economic Developments," which includes provisions for employee pensions as well as machinery replacement. Financial aspects are handled by the company's controller.

The once-a-year technical surveys are made by the plant engineer, in consultation with foremen and methods men. The most important information for making replacement decisions is the maintenance record on each piece of equipment—the number of times down and cost of repairs. Information on every piece of equipment, with the estimated year and cost of replacement, is kept in a loose-leaf binder.

Note that the replacement schedule is not inflexible. Machinery purchases can be postponed; and if a bargain comes along before the machine is due for replacement, there is nothing to prevent its purchase.

After the yearly budget is approved by the board of directors (see right), the plant engineer fills out a form to send up through

American Pulley Does It This Way

Prior to fiscal year, the plant engineer surveys capital assets and forecasts specific year when replacements should be made. Estimated replacement cost is based on bids from suppliers at today's prices. The difference between original cost and replacement cost—the excess cost—is entered in column four.

Sales forecast for next five years is made by the sales department, based on past actual sales and management's judgment.

Next, calculate the average percentage of sales needed to raise cash for excess cost. Divide total sales forecast into total excess cost, and you get an average of 2.33% of sales for five years. However, situation in given year may require special treatment—look at 1957. Percentage allotted is a management decision. This percentage (Column 3) times estimated sales for year gives amount of revenue from sales. Some years show a deficit (Column 5), but five-year period ends with surplus.

Yearly budget is presented to the board of directors in this form. The "Optional Items" could be postponed without too much harm.

Note: Figures used here are not actual company figures.

CALCULATING ESTIMATED COST OF REPLACEMENT

1

1. Estimated Year of Replacement	2. Original Cost	3. Estimated Cost of Replacement	4. Estimated Excess Replacement Cost
1957	$ 65,000	$ 325,000	$260,000
1958	56,000	236,000	180,000
1959	33,000	153,000	120,000
1960	35,000	135,000	100,000
1961	75,000	250,000	175,000
Total first 5 years	$264,000	$1,099,000	$835,000

Date of Inventory: September 1, 1956

FIVE-YEAR SALES FORECAST

2

Year	Actual Past Sales	Year	Estimated Sales
1952	$ 5,500,000	1957	$ 6,500,000
1953	6,500,000	1958	7,000,000
1954	5,700,000	1959	7,500,000
1955	6,000,000	1960	7,800,000
1956	6,800,000	1961	8,000,000
Total	$30,500,000	Total	$35,800,000

DETERMINING "RESERVE FOR FUTURE REPLACEMENT" PERCENTAGE

3

1. Year	2. Estimated Excess Replacement Cost	3. % of Sales Required — Charged as Cost of Sales	4. Estimated Income From Sales Charge	5. Yearly Surplus or Deficit
1957	$260,000	4.0 %	$260,000	$ -0-
1958	180,000	2.0	140,000	— 40,000
1959	120,000	2.0	150,000	30,000
1960	100,000	2.0	156,000	56,000
1961	175,000	2.0	160,000	— 15,000
Total	$835,000	2.41 %	$866,000	$31,000

SUMMARY OF CAPITAL EXPENDITURES FOR FISCAL YEAR 1956-57

4

	"Must" Items		"Optional" Items		Total Program	
	Estimated Cost	Excess Cost	Estimated Cost	Excess Cost	Estimated Cost	Excess Cost
Plant Items	$360,000	$190,000	$115,000	$70,000	$475,000	$260,000
Product Tooling	85,000	-0-	25,000	-0-	110,000	-0-
Total	$445,000	$190,000	$140,000	$70,000	$585,000	$260,000

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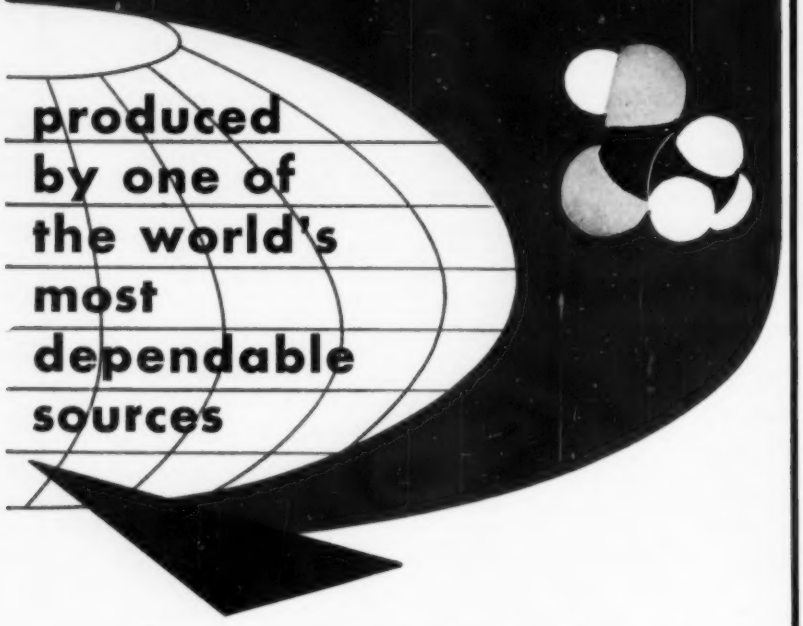

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company channels. This form outlines the jobs the machine will perform, types of products it will work on, and estimates of savings. Savings are computed with the "payoff" formula recommended by the Machinery and Allied Products Institute (MD, April, p19).

In 1955, American Pulley began projecting its replacement needs for 10 years, instead of just five. And it recommends a 10-year look into the future for anyone interested in starting such a fund. ●

Investors Rush to Bank Bills

As the scramble for new money in the U. S. A. grows more frantic, eager borrowers are looking into every corner of the money market. Now their eagerness has carried them into bankers' acceptances—in the past a little-understood financial mechanism in the U. S. A. As MANAGEMENT DIGEST went to press, outstanding bankers' acceptances stood at just over $1,000-million, highest since 1930, and the interest rate on a 90-day bill had touched a 27-year high of 4⅛%.

Tight money is a major reason for the bustling market for acceptances. Another is the high level of foreign trade.

Meanwhile, investors overseas—banks, insurance companies, traders—are finding bankers' acceptances an attractive, highly liquid, short-term investment.

A bankers' acceptance is a bill of exchange that is "accepted" by a bank—the bank guarantees its payment. This guarantee makes the acceptance as readily salable as any other high-grade short-term paper in the open market. In effect, the investor buys—at a satisfactory rate of discount—a certified bank check payable at some date up to six months in the future.

Today, about 74% of the outstanding acceptances in the U. S. A. are used by traders to finance export and import deals. Foreign shipment and storage accounts for another 17%; domestic U.S. uses 6%; and 3% for dollar exchange). (*Business Week, Aug. 24, p92*)

Package material costs have shot skyward for years. And never has packaging been so important as it is today. Here's how food processors have organized to meet . . .

Problems of Packaging Management

Digested from FOOD ENGINEERING, July, p86

Every manufacturer—whether he sells to industrial markets or to the consumer—has a packaging problem of one kind or another. But of all industries, food processors have perhaps the greatest competitive stake in packaging. How they are meeting the problems of packaging management—in the face of skyrocketing packaging costs (chart below)—offers lessons for all businessmen.

The first lesson is simply this: Packaging has become a vital concern of top management—an open area for cost reduction, an essential part of marketing strategy. And every department in a firm—production, research, purchasing, marketing, finance—is involved.

The Nestle Co. has appointed a packaging engineer to coordinate cost data on packaging materials and keep abreast of new developments in materials and machines. At the National Biscuit Co., an outside industrial designer sits in on all meetings of the company's packaging committee. The Welsh Grape Juice Co. writes a detailed history of every packaging project to avoid future duplication. At the R. T. French Co., four members of the packaging committee are members of the company's board of directors.

Huge sums of money are at stake for these food companies—all leaders in an industry that spends over $6,000-million a year on packaging materials. Today, a company's share of the market in this competitive business—as in most consumer fields—depends more and more on having a well-designed, functional package.

Here are some current trends:

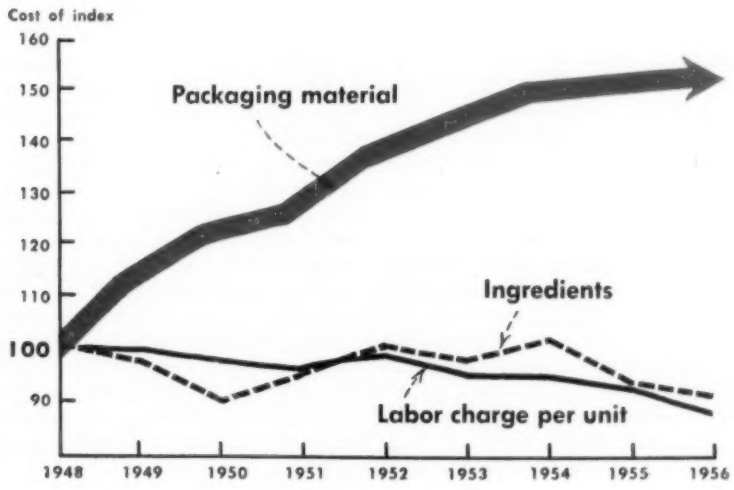
—A welter of new materials are coming on the market (MD, Mar, p27). And old containers are being spruced up with new shapes and features.

—Manufacturers are hiring their own or consulting industrial designers, but they still depend heavily on suppliers for ideas and advice on packaging problems.

—Packaging machinery is faster, more complex and more expensive, requiring careful planning and evaluation.

—Packaging ideas are subjected to rigorous marketing and product-compatibility tests before being accepted.

—Cost control looms larger than ever. Statistical quality control techniques are widely used.



To understand the problem, take a look at this case history:

A frozen food company decided to market a luxury product that a housewife could heat in the package itself. The choice of materials in this case was obvious—a foil pan had all the advantages.

Consumer demand and production costs were thoroughly explored. For further testing, though, several hundred "put-ups" were needed, but none of the company's suppliers had a stock foil pan of the right size. Equipment for making the foil pan was expensive, and a mistake would be costly. So it was decided to use the closest stock pan available—though it was too shallow and had the wrong kind of lid.

This common sense decision was to save the company a lot of money. It had been planned to use a flexible foil lid for the pan. But tests showed a foil and paper laminate would perform better, and the production department felt the laminate would be easier to apply on the line. But more trouble. Corrosion tests indicated the laminate needed a vinyl coating. Finally, it was necessary to redesign the pan lip. Since machinery had not been ordered, it was easy to make the changes.

But even after production was rolling, cost-saving modifications continued to be made. For one thing, it was found the tray could be lightened—using less material—simply by embossing a design on the bottom to add strength.

All companies are making equally determined efforts to reduce the cost of packaging. Through package control alone, one firm realized savings of $1-million a year. This company believes that packaging specifications must be clearly defined and backed by a system of control and inspection, plus close cooperation

AAF Air Filters Help to Pay for 400-Acre City Park

POWER PLANT SAVINGS PROVIDED FUNDS. Because its municipal power plant cut maintenance costs to the bone and showed a big saving, one small town (pop. 2500) has a 400-acre park, complete with swimming pool, golf course and football stadium. AAF air filters on the plant's four diesel engines played the leading role in creating these far-reaching savings.

FILTERS FOR EVERY NEED, EVERY MAINTENANCE REQUIREMENT. In addition to the automatic, self-cleaning filters used at this plant, AAF makes units that are reconditioned by washing, units that feature renewable media, and units that are thrown away, complete, when they are soiled.

WHAT WOULD CLEAN AIR DO FOR YOUR BUSINESS? Instead of selling just one or two types of filters, AAF sells *clean air*, and offers a line of products that will provide it, to your exact requirements. Talk with the AAF representative in your area. Send for his name plus free booklet, *Better Air Is Our Business.*

American Air Filter

COMPANY, INC.

215 Central Avenue, Louisville 8, Kentucky

American Air Filter of Canada, Ltd., Montreal, P. Q.

AIR FILTERS—ELECTRONIC PRECIPITATORS—ROTO-CLONES

Cable Address: AAFCO

with suppliers of packaging materials. A statistical method called "acceptance sampling" is used to check incoming shipments of glass containers, tin cans, lids, labels.

A management committee screens ideas worthy of development, and when research is completed, the results are laid before a top management operating committee. Approval is a signal for purchase of containers for a trial production run. And success here means notice of a new pack, which triggers plans for procurement, promotion, and advertising.

For many of the larger companies, the range of products is great enough to allow specializations. At Kraft Foods, Inc., for instance, one group of package researchers concentrates on corrugated shipping cases and paper packages, another works with flexible film and foil, and a third investigates glass and other rigid materials.

For Kraft the first step in package development is to assess the physical and chemical properties of the product—and for food that means such things as moisture equilibrium, oxidative properties, and bacteriological factors. Taste panels and market samples are used to test the effects of packaging, as well as the sales impact. Kraft has a fully equipped laboratory—including an impact machine to simulate rough handling.

Each project at Kraft is assigned to a project leader, who makes detailed estimates of time and cost, coordinates package research and development short of copy design, art work, and advertising. His research group acts as consultant to production and to purchasing men.

The Birds Eye Division of General Foods Co. goes one step further and makes its product managers responsible for everything—package development and design, advertising, and a complete marketing plan. But there is a staff expert who actually supervises package development. Birds Eye's packaging manager has three assistants, responsible for package development, graphic design, and specifications for procurement and quality control.

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Birds Eye puts its packaging manager under the purchasing director. Other companies prefer a breakdown under engineering, production, operations, or research. There is no pattern; it depends on the company's way of doing business and the available personnel.

However, it is notable that a majority of U.S. packaging experts have come up through marketing or purchasing jobs. The reason is simple: In these departments, a man picks up the necessary background in packaging materials, cost analysis, graphic art, and marketing. Most companies seem to prefer a man with a broad perspective rather than one with a technical background—though at least one company maintains that industrial engineering is ideal training for a packaging specialist.

An "authoritarian" packaging manager must establish a strong line of communication with all departments. Since his work usually must pass muster with marketing, research, production, and engineering men, he strives to get their help and reaction at early—and all—stages of development. As with the committee secretary, the packaging manager is essentially a coordinator.

There is a tremendous body of technical knowledge available to this man—for the asking—from packaging material suppliers, equipment manufacturers, trade organizations, packaging trade fairs, and magazines. Packaging does not demand an expensive research staff.

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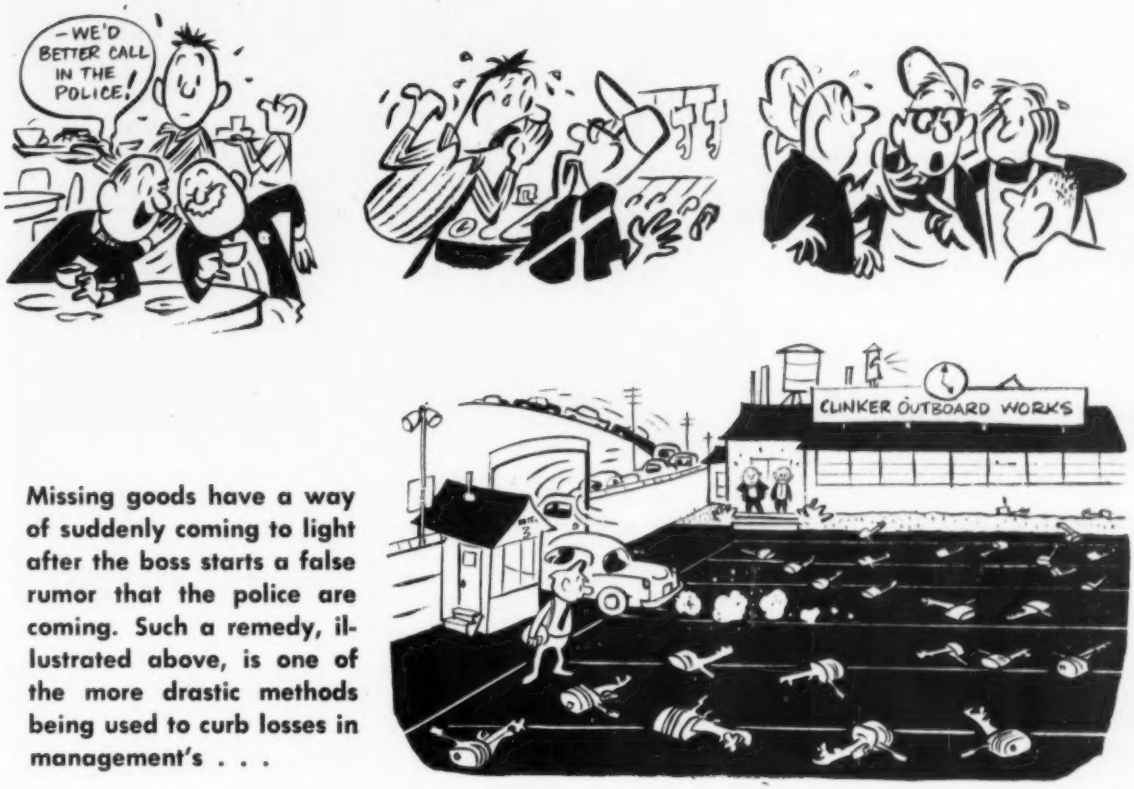

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Search for the Factory Thief

Digested from BUSINESS WEEK, July6, p74

Management has good reason to crack down on industrial theft. In the U. S. A., paid-out claims on fidelity insurance are expected to total about $30-million this year alone, compared to $5-million in 1949. And industry's total losses run much higher—probably to $500-million a year.

Why is there more dishonesty among employees these days?

Industrial expansion is one reason. Internal controls lag behind bigger volume and employment in many companies; new employees often get inadequate screening in a tight labor market. Furthermore, a high standard of living creates social pressures that can drive basically honest persons to crime. And persons who wouldn't dream of robbing an individual see no harm in taking from an impersonal corporation.

Office workers and executives lean toward cash, and they tend to work alone. There are devious methods for embezzling company funds, and many are hard to detect. A treasurer of one U. S. company wrote petty cash checks totaling $10,000 before he was caught. Another got away with $90,000 by ordering bank drafts for his personal creditors, crediting the money to an active account.

Here are some of the other ways: Checks are issued to fictitious suppliers and cashed by faked endorsements. Goods are invoiced below established prices and "kickbacks" in cash go from purchaser to the office man.

Checks are forged, then destroyed when returned by the bank. The theft is concealed by raising the amounts on legitimate checks. The amounts on checks, invoices, and vouchers are raised after they have been officially approved. Proceeds of cash sales are pocketed. Customers are charged more than duplicate sales slips show, with the difference being pocketed. Returned purchases and discounts aren't recorded; equivalent amounts of cash are then embezzled.

Workers use more prosaic ways to carry away drugs, hand tools, electric drills, etc. They tend to operate in teams.

Manufacturers ignore much of this loss, but they cannot afford to do so when large sums of money are involved. An aircraft company lost $100,000 by employees selling scrap metal at reduced prices.

Rather than risk management-employee relations, many companies try to get by without following the basic steps of protection—checking applicants carefully, screening personnel, enforcing strict inventory control, keeping books well audited, maintaining adequate insurance policies that bond employees and executives. Some companies simply put aside special funds to cover in-plant losses. Other companies try to

AAF Air Filters Help to Pay for 400-Acre City Park

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curb pilfering by offering tools and equipment at cut-rate prices. And one electronics maker lends tools to its employees.

Other companies use sterner methods—such as planting rumors (cartoon, first page). Columbus Plastics Products posts a $500 reward for information leading to the conviction of an employee for theft; and the company estimates the offer cut its losses by 95%. General Metal Corp. marks its equipment with electric pencils in a place where it is impossible to grind off the mark. One big appliance company checks the serial number of its transistors every hour. Burroughs Corp. uses closed-circuit television. The guard who monitors the three cameras can hear noises and talk to persons through a two-way sound system.

In some companies, security goes down to the "cabinet file level" to prevent the smuggling out of adding machines, typewriters, pencils and paper by the clerical force.

Many companies have also worked out defenses against front-office embezzlement. Hundreds of offices use surprise audits to check books. Many keep an eye on cash receipts by having the bank mail a duplicate deposit slip directly to the company's auditing department. Some companies keep switching members of their credit and collection departments to different posts.

A few companies have resorted to lie detectors to check dishonest employees—and if workers take the test, executives can hardly refuse. One such company says it has only to threaten its use before the thief comes forward, or secretly returns the stolen goods.

But even after the thief is caught, there still remains the big problem of what to do with him. Most companies refrain from prosecuting pilferers; restitution is all they want. One concern likes to punish pilferers with a dirty, unpleasant assignment.

Embezzling executives get tougher treatment. If large sums are involved, almost all companies prosecute with a vengeance. And if a company suspects, but can't prove, that an executive is embezzling, it will find some way to nudge him out. ●

Dean Clark Myers (left) and Professor H. R. Tosdal—both former Harvard professors—form nucleus of teaching staff for Nestle's new Ouchy Management Development Institute.

"Harvard" on Lake Geneva

Digested from BUSINESS WEEK, Aug3, p99

Last month 35 young men, 28 to 38 years old, from all over the world began the first eight-month course in Europe's newest experiment in management education.

Patterned on the U. S. A.'s Harvard Graduate Business School's middle management program, the Ouchy Management Development Institute — nestled along the wooded shores of Lake Geneva, Switzerland—will use the "case study" method of teaching with "live" business problems.

The Institute is financed completely by Nestle Alimentana Co., the Swiss chocolate and coffee firm; student-managers from Nestle's worldwide empire of 132 plants will attend, tuition-free.

But Nestle is also training young men from other companies (they will pay about $1,250 for tuition and books). In this year's first class, a third of the students are from such companies as Swissair, International Business Machines, Givaudan (perfume), and Hoffman-LaRoche (pharmaceuticals). Next year two-thirds of the students may be outsiders.

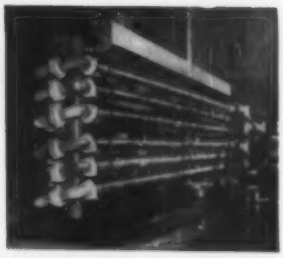
For Nestle, the Institute makes good sense. With annual sales running at $1,100-million and business expanding, Nestle needs a steady supply of well-trained management men to move into top positions. To fill this need, Nestle's two managing directors, Enrico Bignami and Jean C. Corthsey, decided to organize a school directly under the company's wing.

Nestle has granted the school an initial endowment of $750,000. Above that the company expects it will have to pay as much as $280,000 yearly for operating expenses. But by allowing outsiders in the school, Nestle hopes to win support from other companies.

Nestle looked for the best men to staff the institute. It got Clark E. Myers, an ex-Harvard professor and dean of a leading U. S. business school, to run Ouchy. Myers, in turn, helped to round up a permanent staff of other Harvard-trained men—six in all, including Professor Harry R. Tosdal, a noted member of Harvard's faculty who retired recently.

In addition to its own facilities, the school will also have close academic ties with the University of Lausanne. One educator sums up the Ouchy approach: "Europeans think U. S. business education is too vocational. But they admit their own is too classical. The Nestle school is searching for a middle ground—with something of each."

Ouchy Institute is not the only educational project helping to revitalize business education in Western Europe:



Scale deposits which impede heat flow do not form on the hard, smooth inside surface of the CORNING pipe in this heat exchanger.

CORNING brand sight glasses provide visibility plus heat and chemical resistance.

This pipe would last **203** *years on a diet of hot hydrochloric acid*

Handling corrosive fluids may be forcing you to pay more than your share of industry's multi-billion dollar annual bill for the perpetual war against rust.

CORNING brand "Double-Tough" glass pipe can help you cut your corrosion losses.

This pipe carrying 5% hydrochloric acid at 212° F. loses only .0003 inch of its thickness in a year. At that rate it would take over 200 years to eat away 30% of the wall thickness. It would take over 600 years to eat completely through the pipe.

CORNING pipe not only resists eating away by hard-to-handle fluids. It's also easy to flush clean. Even sticky substances and organisms won't adhere to its hard, smooth surface. Its transparency is often important, too. You can see what's going on inside—spot trouble in the making.

You don't have to worry about breakage. CORNING pipe is called "Double-Tough" because all fittings and flanged ends are tempered. This makes them 2½ to 3 times stronger than ordinary glass.

CORNING pipe is only one example of how glass by CORNING is aiding industry. If your problem is corrosion—or cleanliness, heat resistance, light transmission, visibility or better looks for your product—consider glass by CORNING.

Why not write today and see how glass can help you either as piping or for some other application?

FREE BOOKLETS: Send the coupon or write for copies.

This 16-page booklet, "CORNING brand 'Double-Tough' Glass Pipe in the Process Industries," illustrates the experience of many users.

This new 48-page booklet, "Glass and You," will bring what you know about glass up to date. It may spark a new product or a new production idea.

CORNING GLASS WORKS

International Division
Export Sales Department B-10
718 Fifth Avenue
New York 19, N. Y., U.S.A.

Corning means research in Glass.

CORNING GLASS WORKS • INTERNATIONAL DIVISION
Export Sales Dept. B-10, 718 Fifth Avenue, New York 19, N. Y., U.S.A.

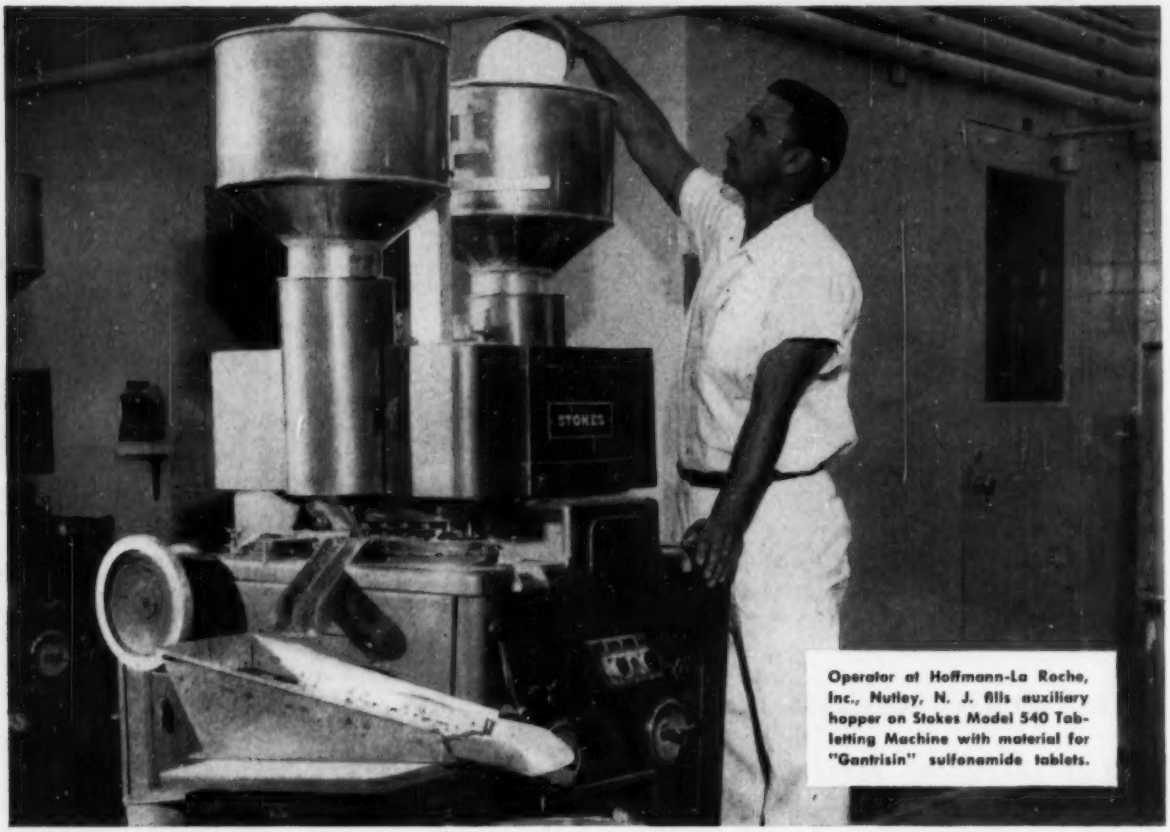
Please send me a copy of "Glass and You" ☐ and a copy of "CORNING brand 'Double-Tough' Glass Pipe in the Process Industries." ☐

Name _____

Company _____

Address _____

City _____ Country _____



Operator at Hoffmann-La Roche, Inc., Nutley, N. J. fills auxiliary hopper on Stokes Model 540 Tabletting Machine with material for "Gantrisin" sulfonamide tablets.

Hoffmann-La Roche ups "Gantrisin" output 50% with new Stokes machines

Quality pharmaceutical products are being tabletted at high rates and low costs with new Stokes rotary tabletting machines at Hoffmann-La Roche, Inc., Nutley, N.J.

Here, several Stokes Model 540's are proving their ability to perform beyond expectation. For example, they are used to produce "Gantrisin"—3,4-dimethyl-5-sulfanilamido-isoxazole—tablets . . . widely used for the treatment of pneumonia, tonsillitis and other serious diseases. According to Mr. Sidney Harris, Director of Pharmaceutical Production, these new Stokes machines increased production by over 50%.

The Stokes Model 540 is the easiest machine to set up and adjust that has ever been developed for tabletting. All controls and adjustments are readily accessible on a single panel. Pressure adjustment is made hydraulically by push button control.

The 540 takes little space. It is built for long life, long tool service, with centralized pressure lubrication and safety overload protection. No special foundation or permanent mounting is needed—vibration mounts are built into the machine.

Many manufacturers throughout the world profit by Stokes unparalleled experience in serving industry as designers and builders of industrial machinery and process equipment. Stokes offers a diversified line of precision-engineered, cost-saving production equipment . . . including Vacuum Furnaces, Systems and Pumps; Chemical Process Equipment; Powder Metal Compacting and Plastic Molding Presses; Pharmaceutical Tabletting Machines and Accessories. Stokes also offers extensive research laboratory and customer advisory facilities. Your inquiry is invited.

International Division
F. J. STOKES CORPORATION
5500 Tabor Road, Philadelphia 20, Pa., U.S.A.

STOKES

—Another Swiss school, at Geneva, is financed by Canada's Aluminium Ltd., primarily for Aluminium personnel.

—An Italian business school called IPSOA, set up by the Olivetti and Fiat firms is operating at Turin with visiting Harvard professors.

—A French management school at Lille (MD, Feb., p13) is supported by businessmen in the surrounding industrial area.

—The Paris Chamber of Commerce is organizing a "European School of Business" centered in Paris.

To help launch such business schools, the U.S.A.'s Ford Foundation has earmarked $98,000 to start a pool of visiting American professors. And the European Productivity Agency is carrying on some of the Marshall Plan's early assistance to universities who are working to revamp their own business education courses. ●

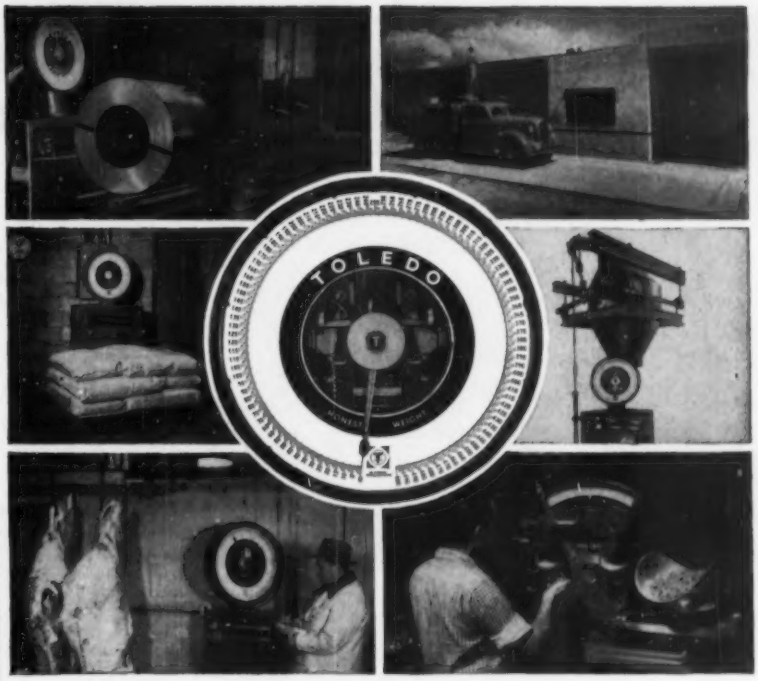
Getting Rid of The "Yes-Man"

The "Yes-Man," a staff executive who constantly agrees with his chief, is no good to any organization, least of all to the superior with whom he always agrees. According to *Management Review*, the president of one American firm is doing something drastic to curb "yes-man" attitudes.

He has installed a vice-president whose major role is not to conform. "The function of this man," explains the president, "is to stimulate critical thinking. He is a deliberate minority, attacking reports, ideas, and programs that have the group's blessing."

Sometimes, the president adds, the new vice president is too much the non-conformist. But he has done a lot of good—so much so that the president uses the bonus plan to encourage "non-conforming."

Last year, one executive threatened to resign if one of the president's favorite projects was put into effect. He got a bigger bonus than those who made little effort to find out the flaws in the scheme and speak up. ●



On Your Scales

Materials Become Money

You can prevent losses and speed your material handling—by bringing your weighing up-to-date with new TOLEDOS that provide automatic indication of weight.

Remember—good weighing is a fundamental of good cost control; basic accounting records of materials received, shipped or transferred start at the scale. In Toledo's complete line there is a modern answer to every problem of industrial weighing . . . to help you save time and money. Write for new condensed catalog No. 2001.

Print Your Weights

Stop Human Errors!

Get fast, accurate *printed* weights with Toledo Printweigh. This eliminates errors in reading, remembering and recording weights. Choice of ticket, sheet or strip tape records. Available on Toledo dial type scales of all capacities.

TOLEDO SCALE COMPANY

Toledo 1, Ohio, U.S.A.

TOLEDO®

Headquarters for Scales

How Sheaffer Advertises Around

Digested from PRINTERS INK, Aug. 9, p34

Overseas distributors apply the same advertising techniques that this pen maker has developed in the U.S.A.

"White Dot" theme is carried out by Sheaffer distributors with many minor variations

A CENTRAL THEME with local variations—that is the story of the advertisements on the right. The idea was supplied from international headquarters of the W. A. Sheaffer Pen Co. in the heart of the U. S. A.'s Middle West. The advertisements were executed, and campaigns planned, by foreign businessmen — Sheaffer distributors—around the world.

"Our distributors are on the scene, so they know what media and what kind of advertising are best suited to their purposes in their areas," explains Karl Dinnauer, Sheaffer's director of foreign sales. And the entire success of Sheaffer's marketing efforts is based on a firm conviction that the advertising techniques that have worked in the U. S. A. can be applied around the world with the same result.

To aid in this sales drive, Sheaffer recently created a new management position—a sales promotion manager for its international division. Andre Voya Peters' job is to line up distributors, keep an eye on their promotion and advertising activities, and recommend new distributors to replace those weak in promotion. At home, he works on central themes that can be adapted for advertising, and designs displays. And he will go abroad to help distributors and dealers work out problems peculiar to their home market.

For one thing, special gift occasions vary from region to region. In the U. S. A., for instance, Sheaffer makes a big splash on "Mother's Day" and "Father's Day." Other countries have their own special occasions—and even gift-giving at Christmas varies around the world.

Sheaffer provides for its distributors much direct-mail material showing only illustrations and logotypes (the tradename), but no copy. Distributors overprint their own messages.

Climate also presents problems. In moist, hot climates, cardboard displays must be coated with plastic for protection against wilt. Because of the need for durability, most Sheaffer point-of-purchase display pieces are made of wood, glass, metal, or plastic. Lack of store space in many markets is another factor—so displays are kept relatively small.

Sheaffer's 1957 overseas advertising budget—$400,000—is double last year's (ten percent of overseas sales income is plowed back into advertising and promotion). About 90% is allocated directly to distributors; the other 10% goes into the development of display pieces.

Note this aspect of Sheaffer's world sales strategy: The company advertises in countries where Sheaffer products are not now sold because of import restrictions (Argentina, Brazil, Burma, Colombia, and India). The theory is that by advertising today, Sheaffer establishes consumer acceptance for the day when the restrictions are lifted. ●

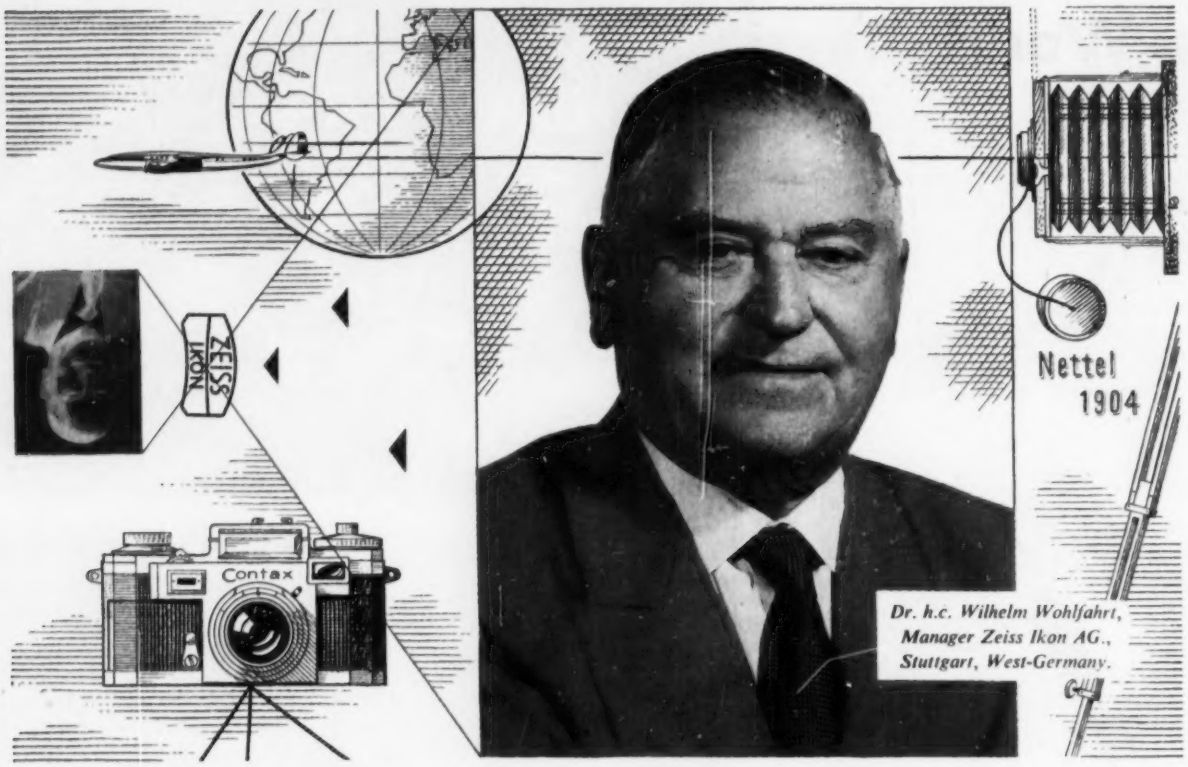
the World

in layout and copy and secondary appeals.

Swiss strollers are lured with imaginative window displays in shops.

Panamanian pedestrians and . . .

. . . Belgian motorists are treated to outdoor displays in high-traffic areas.



Dr. h.c. Wilhelm Wohlfahrt, Manager Zeiss Ikon AG., Stuttgart, West-Germany.

He multiplied Man's eyes and memory

The year, 1904. The place, Germany. And a young man was faced with a momentous decision. To relinquish a sound, secure job for a partnership in a tiny factory manufacturing cameras, those bulky, newfangled gadgets. He chose photography. Today, as Manager of the giant Zeiss Ikon Works, Wilhelm Wohlfahrt has seen a dark-room dream become a reality.

It was a mountainous road he set out upon. Obstacles were many; the unwieldiness of the cameras, the lack of public interest, an ineffective sales organisation. Double Double-U took them all. He focussed public attention on the wonders of photography. He pooled forces with the Contessa works when the first war had disrupted the Zeiss concern. Quickly, the joint names acquired renown, and the organisation, inspired by W.W.'s undaunted faith, grew as the size of the cameras shrank. Intelligently anticipating the depression, W.W. realised his master-plan, the merger of the four leaders in the field; welded them to the Zeiss Ikon concern. Again, a war levelled it all, but W.W. lived in his own world of indestructable ideas. He nursed the giant back to robust health. A Doctor's degree was his reward, of the Grand Cross of Merit, on the occasion of his Golden Jubilee. But his happiest hour is still that of his first big sale, twelve stone-heavy cameras to a Swiss optician.

Dr. Wohlfahrt admires KLM. Spiritual kinship maybe. "I believe we are all servants of some fine idea," he says, "KLM chose the idea of comfort first and fast, and live up to it."

KLM
ROYAL DUTCH AIRLINES

All over the world people of sound judgement fly KLM

Corporate Directors Meet Advertising Challenge

Digested from TIDE, August 9, p15

Advertising is becoming an important subject of debate in the Board Room. Advertising budgets are burgeoning. The concept that advertising is but one part of a total marketing strategy is gaining popularity. And more advertising and sales executives are sitting on boards of directors.

It was not always so. The 1920's and 1930's are often described as a "financial era"; the 1940's, a "production" era. But today advertising budgets are frequently as important to corporate directors as new plant sites or a diversification program. In fact, one out of 10 of the biggest advertisers in the U. S. A. spends one dollar on advertising for every dollar of net profit. That is one reason why stockholders are bringing up advertising strategy and appropriations for open discussion at company meetings.

Corporate directors are refining their questions concerning advertising to fit the newer, more sophisticated view that it is but one of the several elements in a total marketing concept. "We want to know," comments one director, "how much the total marketing program for a new product will cost. Should more go into packaging? Is the price right? Is the advertising properly geared to our distribution pattern?"

That more advertising and sales executives sit on boards of directors these days is shown by several surveys. In a broad study of 535 manufacturing companies—covering 4,000 directors—the National Industrial Conference Board found that sales executives hold more directorships than any other group of operating vice presidents—including financial executives. Another survey of the U. S. A.'s 100 biggest advertisers revealed that 38 had at least one advertising or marketing executive on the board. Leaders in this trend are the high-volume package goods concerns—soap, cigarettes, canned and frozen foods makers.

Operating procedures differ widely. But in general the boards of directors concern themselves with basic advertising policy—such as the way the company's "personality" is presented—and not routine matters such as the number of one-minute television "spots" in a specific market.

But it seems to make a big difference whether a board is made up of "insiders" or "outsiders". A board made up mainly of men not employed by the company seems to function less as a maker of advertising policy than as a watchdog over it, contributing, as one director put it, "fresh points of view."

An "outside" director of one of

The well known

BLUE BIRD

manually operated

SWEEPER

is now available with motorised or electric vacuum attachment

Extremely compact and easily operated in confined spaces this new BLUE BIRD can be used with or without suction as required. Available with 80 C.Cs. Petrol engine operating 4/5 hours on one filling or ½ h.p. Electric motor, all voltages. Suction 65 cu. ft. per minute. Dust bag approx. 2½ cu. ft. A 9ft. extension for wall or shelf cleaning is also available if required.

DESIGNED AND MANUFACTURED BY

Cimex-Fraser Tuson Ltd.

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the biggest cosmetics firms in the world—reputedly spending $12-million a year on advertising—says this about his duties:

"In our board meetings, we examine advertising copy, and sometimes even the ratings of television programs. We analyse the relations between the company and its advertising agency. In fact, our board gets a very detailed presentation from the company's advertising vice president on next year's plans, with a media breakdown, product by product, sales region by sales region."

"Inside" directors are also intimately involved with the problems of daily operations—and they bring their special knowledge to the board meeting.

One of the best examples of the trend toward "working boards" is Standard Oil Co. of New Jersey. Each director concentrates on an area of special interest. Two directors have direct responsibility for public relations, and literally make policy for institutional advertising campaigns. ●

. . . to capitalize on tremendously expanding world demand for modern earth drilling equipment. Our leading line of hydraulic rotary drills includes everything from lightweight, jeep-mounted rigs to heavy-duty, multi-purpose mobile units; also complete accessories, service set-up.

Top-Notch Distributors Wanted—Deal Direct With Factory

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MOBILE DRILL

YOU AND YOUR PERSONAL AFFAIRS

The "high season" for business travel to the U.S.A. is at hand. Here are some avenues you might want to explore as you plan the business side of your visit.

First of all, your own government has representatives in U.S. business centers. This could well be your Number 1 approach.

Next, you might want to check the services of the U.S.A.'s Bureau of Foreign Commerce. This fall, for instance, the Bureau is handling group tours of French manufacturers of housewares, Italian "small" businessmen, Swedish wholesalers. The Bureau offers its services to individuals as well, maintains 33 field offices across the U.S.A., and it works closely with trade and professional organizations.

If you wish, the Bureau will list your name and your business mission in **Foreign Commerce Weekly,** its magazine for trade-minded Americans, and its **World Trade Directory of Foreign Businessmen.** If you are interested, contact the commercial attache in a U.S. embassy or consulate.

Many businessmen prefer to go through normal business channels. Government agencies are necessarily "neutral" in business matters; they can supply lists of people to see, and even arrange visits, but they cannot match the credit checks and opinions of reliability available through banks.

Demand from businessmen is forcing banks into the travel business. Already, the big U.S. banks with world-wide operations are licensed travel agents in many countries. And these big banks have people who specialize in bringing businessmen together. And, don't forget that your local bank will probably have a "correspondent bank" in the U.S.A.

A letter of introduction from your local bank is essential. Bankers and businessmen want to know who you are.

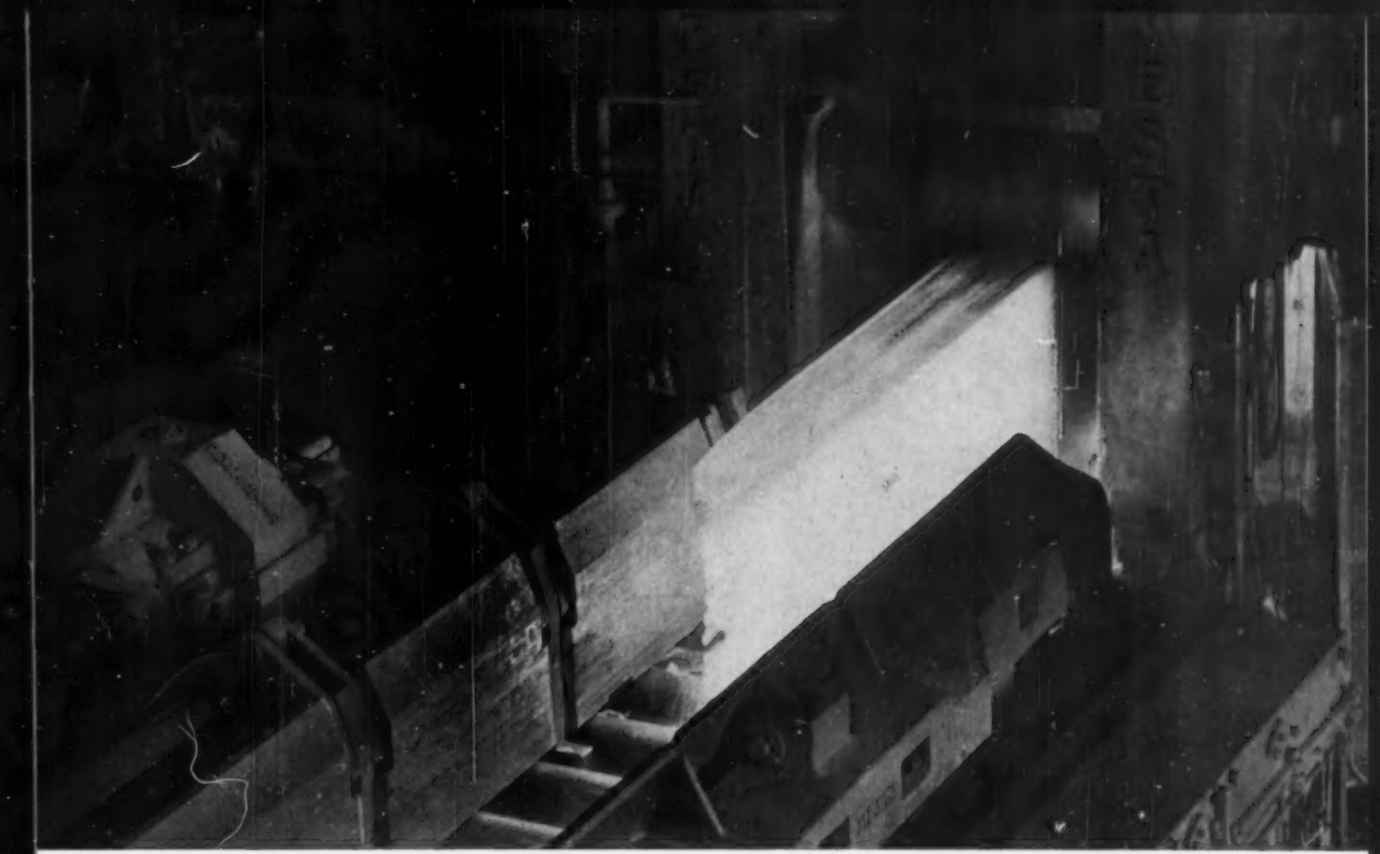
If you will need large amounts of money to complete a transaction, it is best to open a "clean credit" with a specific bank at one point. A copy of the credit will precede you, and you have only to identify yourself to use the credit.

Travelers checks—not letters of credit—are standard currency for the usual business and personal expenses. These protected checks can be bought at any bank. They are issued by Thomas Cook & Son, American Express, Bank of America, and First National City of New York.

Thomas Cook and American Express are the two giants of the travel business. Both are franchised bankers in many countries (though not in the U.S.A.) and this may be your normal business channel. Many businessmen traveling on official dollar allowances use Cook's Foreign Voucher Department or American Express's Overseas Patrons Service. Both handle arrangements for tours, tickets, hotels, too.

You can make good use of your membership in management and industry groups. Their spirit of international cooperation is generally strong, and through them you can make contacts, attend fairs and conventions, and the like.

Be forewarned that you may run into an occasional American businessman who will treat you with suspicion. This usually comes up when an outsider wants to make a detailed tour of a process plant. But the majority are usually pleased to exchange viewpoints on business and technical matters.



General Electric puts the muscle...

IN THE GIANT'S SQUEEZE

G-E System-engineered electrical systems assure economical power for increased steel production.

Glowing steel on its way to build our industrial world needs a lot of pinching and prodding from giant mills. In plant after plant it's General Electric equipment that gives these giants the squeeze that gets a product out faster, yet more exactly to a customer's fancy.

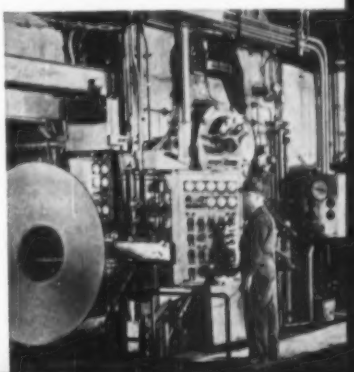
Some like it hot. The 60-inch hot strip mill at McLouth Steel Corporation utilizes individual G-E motors for each roll of roughing mill front and rear tables, as well as roughing and finishing mill approach tables. Pumpless rectifiers in unit substation arrangement are employed to supply power to individual finishing-stand motors. The results are greatly increased flexibility and ease of maintenance.

Some like it cold. Another company—Weirton Steel—brings to the job the 28,000 hp of its G-E drive system in the world's most powerful cold strip mill. Low inertia d-c motors assure fast acceleration, balanced speed for the operation. With the new automatic General Electric X-ray gage control system, this means a product of highest quality steel, with closer tolerances, at higher rolling speeds.

General Electric engineers are helping design, modernize and expand steel facilities everywhere. From blooming mill to crane control, G-E equipment speeds product flow, cuts processing costs for growing industry. General Electric's facilities are available to you. Just consult your G-E representative. *International General Electric Company, Dept. 57-37, 150 East 42nd Street, New York, N. Y., U. S. A.*

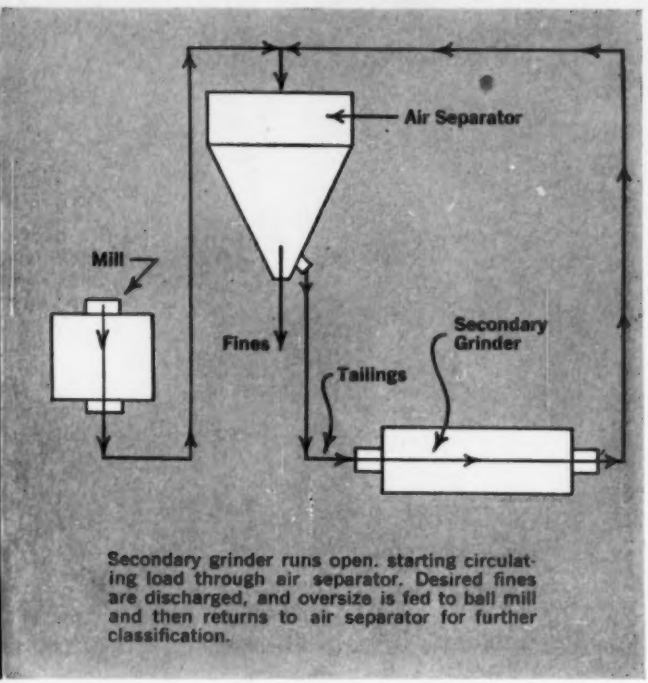
GENERAL ELECTRIC

—U. S. A.—



Stop Overworking Grinding Mills

FEED SPOUT
Sturtevant Air Separators come in 9 models, diameters range from 3 to 18 ft.
TAILINGS DISCHARGE
FINES DISCHARGE



Secondary grinder runs open, starting circulating load through air separator. Desired fines are discharged, and oversize is fed to ball mill and then returns to air separator for further classification.

LET STURTEVANT AIR SEPARATION HELP YOUR SYSTEM PRODUCE UP TO 300% MORE 40 TO 400 MESH FINES — CUT POWER COSTS AS MUCH AS 50%

Fines that pass through grinding mills unhindered, serving only to increase the work load, can be quickly classified by a Sturtevant Air Separator operating in closed circuit. With all oversize automatically returned for further grinding, the result is production capacity impossible to achieve in single-pass grinding — as well as a better, more uniform product.

Closed circuit grinding and air separation is of proved advantage in *all* secondary reduction processes. Grinding mills are free to perform at top efficiency, their output frequently increased as much as 300% and power costs cut up to 50% (documented by 30 years of Sturtevant air separation experience in the cement industry). Further, attritional heat is dissipated by greater surface exposure.

Sturtevant Air Separators Keep Grinding Units At Peak Efficiency — Classify Feed Loads to 800 Tons Per Hour

Sturtevant Air Separators circulate production loads with exact control of air currents and centrifugal force. Simple adjustments make possible counter-action between the two to the point where a product of almost any desired fineness may be collected while coarser sizes are rejected.

A 16 ft. Sturtevant, for example, took a feed rate of 800 tph, containing only a small percentage of desired fines, and delivered 30 tph 90% 200 mesh, recirculating the oversize through the grinding circuit. (In the cement industry, Sturtevant units deliver up to 60 tph raw cement fines, 40 tph finished cement fines.)

Sturtevant's ability to engineer precise, high capacity classification for closed circuit grinding systems is the result of long experience with a wide variety of dry processes. Sturtevant designed its first air separator some 40 years ago — and has been pioneering developments in centrifugal classification ever since.

Current users of Sturtevant Air Separators include manufacturers of sulfur, soybeans, phosphate, chocolate, feldspar, sand, pigments, limestone fillers, abrasives, plasters, ceramics and cement.

Designed for precise separation of all granular materials, Sturtevant Air Separators have been adapted to other materials as well. Johns Manville, for example, uses a 10 ft. model to separate 3 to 6% undesirable rock from asbestos.

Ruggedly constructed, Sturtevant units are designed for minimum maintenance — at a Midwestern rock-crushing plant, a 10 ft. Separator operates outdoors year-round with only routine care.

For further information, request Sturtevant Bulletin No. 087. Write Sturtevant Mill Co., 141 Clayton St., Boston 22, Mass.

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CONVEYORS • ELEVATORS

Solar Cell Gets Ready for Commercial Use

Lower prices, new applications, spur industry's interest in a device that converts sunlight into electricity.

Digested from BUSINESS WEEK, July 20, p56, p66

Every day about 10°-million kilowatts of solar energy go to waste. You get an idea of the figure's immense size from the fact that it is a rough measure of all the energy contained in the world's known resources of coal, oil, natural gas, and uranium.

Today, man is slowly learning how to catch some of this wasted energy and put it to work. One of his most important achievements is the solar cell, which is now moving out of the experimental stage and into commercial applications.

The solar cell is a direct result of Bell Telephone Laboratories (U.S.A.) research on the transistor. Bell discovered that small cells made of crystallized silicon would convert sunlight and, to a lesser extent, incandescent light into usable amounts of electricity.

The Solar Div. of Hoffman Electronics Corp. (Chicago, Illinois, U.S.A.), a Bell licensee, is one of the first companies to adapt the discovery to commercial use. It is making solar cells for a number of military and industrial purposes.

Up to now, the price of silicon has blocked commercial applications of the solar cell. Two years ago the cost of manufacturing solar cells was $1,000 a watt; now lower silicon prices and increased production of cells have brought the cost down to $60 a watt. And eventually the price might be $10 a watt.

The latest company to join the group of silicon producers is W. R. Grace & Co. (U.S.A.). It has joined with France's Pechiney chemical complex to build a plant —in the U.S.A.—using Pechiney's process for purifying silicon. This process is said to produce much more uniform quality than has been achieved by others.

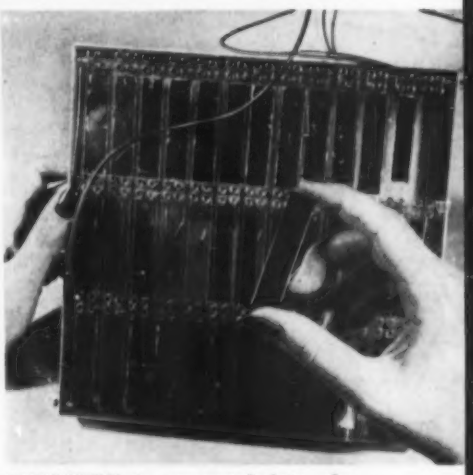
Industry and government are finding several applications for the solar cell. General Electric Co. and Westinghouse Electric Corp., for example, are using them for such things as temperature detectors, to help control the rate of withdrawal of ingots being heat-treated. When the proper temperature is reached, the cells react to the ingot's glow, and automatically start the machinery. The cost of a solar cell for a detector of this type is about $50. But the complete instrument—including complex control and analysing equipment—sends the cost to $25,000.

Bell Labs has used solar cells successfully to operate an experimental telephone system in Americus, Georgia, U.S.A. (pictures). Several cells were linked together on a square plate. The joined cells converted enough solar energy into electrical power to permit transmission of voices through the lines.

The U.S. Air Force is using solar cells in high-altitude balloons, replacing heavier electrical power equipment and requiring less space. The U.S. Coast Guard uses them for coastal lighthouses located in rugged, inaccessible terrains while the Forestry Service is putting the cells in power relay stations.

Basically a solar cell is nothing more than a slice of silicon crystal, usually wafer thin, with a hollow center. One side of the cell has a free positive charge and the other negative. An impurity is injected into the hollow center. Light hitting the impure center forces free positive and negative charged particles into the matching side of the silicon crystal. This sets up a voltage across the

SOLAR CELL, invented by Bell Labs, consists of a strip of pure silicon.



SUNLIGHT is converted into electricity by cells linked in a series.

TELEPHONE SYSTEM is equipped with solar cells for test operation.

crystal; the power can be used immediately or stored for later use in batteries.

About 14% of the light hitting the cell is converted into electricity. Bell expects future development to raise this to 22%. The efficiency of a good gasoline engine runs about 25%.

The cells last indefinitely because they have no moving parts and light does not damage them. This is why it is practical to use solar cells in remote places and leave them alone for long periods of time. Only occasional cleaning of the cell's surface is required. ●

Australia Makes its Own Rain

Airborne cloud-seeders prove key to practical rain-making; cost is low and rainfall is up 25%. But there's no rain from a cloudless sky.

Digested from the TIMES REVIEW OF INDUSTRY, July, p108

"Down Under" in Australia, researchers believe they have finally achieved success with artificial rain-making experiments.

The Commonwealth Scientific and Industrial Research Organization says it can increase rainfall over a suitable area by more than 25% in a year; all elements of chance have been eliminated. This is the best rain-making effort to date. And Australian techniques may prove useful elsewhere.

To be sure, rain cannot be produced from a cloudless sky—dry interior areas have little hope. But when abundant banks of cloud move inland, there are good prospects for increasing rainfall.

The CSIRO rain-making methods artificially produce the conditions that induce natural rain. An ordinary rain cloud is cold on top, warm underneath. Minute ice crystals may or may not form in the cold upper region. If they do, they accumulate until they become heavy enough to sink into the warmer layer of the cloud, attracting moisture into little drops of rain as they fall.

Silver iodide crystals have the same physical shape and size of an ice crystal. When seeded into the cloud, sufficient ice collects on the silver iodide crystals to precipitate rain.

American rainmakers have tried seeding clouds from the ground with little or no success. The Australians, on the other hand, mount silver-iodide crystal generators on each wing-tip of an aircraft. Crystals disperse widely through the cloud as the aircraft flies through it. It costs about £A50 worth of flying to seed 2500 square kilometers of cloud. Seeding is conducted on a random basis without regard to prevailing weather conditions.

The Snowy Mountains region in New South Wales has been the chief scene of the experiments. The region has been divided into two equal areas as nearly alike in contour and climate as possible. The northern area was never seeded; the southern area was reserved for experiments. Before the experiments the two areas shared the same rainfall. Since then the southern area's rainfall increased 25%. ●

No Pallet Needed for This Load

Palletless handling of packaged products has proved an important cost-cutter in warehousing operations at Procter & Gamble Co. (U.S.A.). The new system permits unit loads of up to 412 cartons (total weight: 1500 kilograms) to be moved without palletization. Substantial reduction of storage and pallet costs are claimed; and only a few of the firm's 300 products have proved unsuitable for palletless warehousing. Cases of granulated soap, heavy cartons of liquid detergents, unit loads of crates, drums, and cans—all can be handled by special hydraulic clamps, adjustable in width from 50 to 180 centimeters. The clamps can be quickly mounted on standard forklift trucks. (*Chemical Week, Aug* 3, *p*42)

from cold strip to finished tubing
IN SECONDS!
with a YODER
ELECTRIC-WELD TUBE MILL

One of the fastest . . . and one of the least expensive . . . methods of making steel tubing is with a Yoder Electric-Weld Tube Mill. The Yoder method eliminates the need for time-consuming heat treatments and costly conditioning furnaces for most tube needs. Scrap losses, too, are far lower than any other method . . . usually less than 2%.

The Yoder Type-M Mill shown above is operated by one man and a helper. Coiled strip on this mill is continuously cold-roll formed, welded and cut to required lengths in a matter of seconds . . . at speeds up to 340 f.p.m. The quality of the resulting tube is *constantly* better than the requirements of commercial standards. This is one of many reasons why manufacturers and users of tubing the world over are using more Yoder mills than all other makes combined.

If your business requires pipe and tubing, ferrous or non-ferrous, in sizes from ¼-inch to 26-inch diameter, Yoder can supply the engineering service and machines to produce it faster and better for less! For complete details, write for the Yoder Tube Mill Manual. It's yours for the asking.

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5517 Walworth Avenue • Cleveland 2, Ohio

ENGINEERING **YODER** MANUFACTURING

PIPE AND TUBE MILLS (ferrous or non-ferrous)
COLD ROLL FORMING MACHINES
ROTARY SLITTING LINES

Particle Board Booms in U.S.A.

Cheap raw material lures many companies into the particle-board business. But the lack of standards and firm markets hinders particle-board progress.

Digested from the WALL STREET JOURNAL, Aug 1

America's lumber, plywood, and furniture industries are going wild over a new receipe:

Take 1200 kilograms of wood leftovers. Pour into one $75,000-or-more plant. Grate leftovers into tiny slivers or fragments, as desired. Mix well with 75 kilograms of glue—ordinary soya cattle feed, with water, will do. Press firmly between two steel plates, trim into panels, and dry.

This will produce 90 square meters of particle board, a product so simple and cheap to make that it is surging into popularity. It is trimming the costs of houses, sewing machines, radio and TV cabinets, and aiming for still wider markets.

Biggest attraction of the particle boards is that the principal raw material can be found around almost any lumber or plywood mill or furniture factory. This is the pile of wood shavings, often burned as waste. A particle-board maker can buy this waste for practically nothing.

There are many variations to the basic recipe, of course. But with all processes, costs are low—so low that particle board can undersell plywood in many cases and is consequently cutting into plywood's lucrative markets. Its main drawback is that it has only 50% to 90% of plywood's strength, depending largely on the size of the wood particles used.

Particle board is making its biggest inroads in spots hidden from the consumer's eye. It is employed as "corestock"—the material that lies underneath the expensive hardwood veneer in furniture or beneath the coverings of kitchen cupboards, wall panels and table tops. Particle board has not yet proven itself officially as a structural material. So it is not able to invade the hard board and composition board market. But even these markets may fall.

There is plenty of testimony, however, that the particle-board industry does not lie entirely in a bed of soft boughs. Many new mills are rushing in. "We are not running steadily and when we do, it is only for two shifts a day," says one mill executive.

Also, particle board lacks standardization in an industry where standards mean markets. As a result of differences in methods and materials particle board also has no standard price. But a newly-formed Particle Board Association now is setting up standards for approval by the U. S. Department of Commerce, which producers say would help open the market. ●

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MANAGEMENT DIGEST invites other consultants to list the special services they offer on these pages.

APPLIED CRYOGENICS...

a new process environment

Strange things happen to gases, liquids and solids at the low end of the temperature scale. Many techniques long used at normal process temperatures serve with surprisingly effective results at extremely low temperatures. Heat- and mass-transfer purification processes, mechanical separations, stabilization of highly reactive chemicals and transport of liquefied gases are among the current list of profitable cryogenic applications . . . and the end of new possibilities is not in sight.

Air Products is on firm ground in this strange cold world. Its lifelong experience in the liquefaction and separation of gases has developed familiarity with low temperature phenomena and established its leadership in the field of applied cryogenics.

Steel mills, chemical plants, rocket and missile installations depend on Air Products' equipment to provide reliable supplies of high purity gases and liquids from a wide variety of atmospheres and feedstocks.

Possibly some phase of this expanding technology may be useful in your work or help you to solve a difficult process problem. For informed assistance, call or write Air Products, Incorporated, P.O. Box 538, Allentown, Penna.

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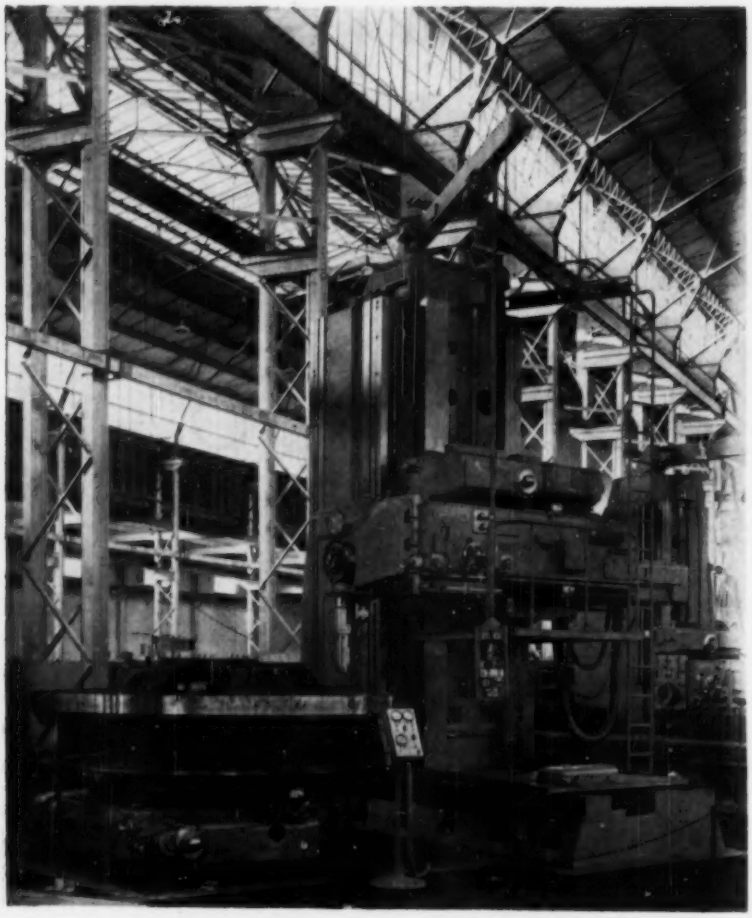
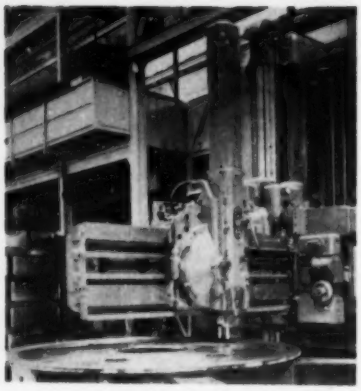




Instead of moving large workpieces for many machining operations, Italy's Innocenti builds the machine tool around the workpiece. Picture above shows the basic machine. In the left foreground is the rotary table; the powered head, center, has both vertical and horizontal spindles. Picture at right shows horizontal arm that clamps to machine for precision boring.

Italians Make Them Bigger

Digested from AMERICAN MACHINIST, July 29, p96

The larger the workpiece, the more difficult the machining techniques. Accuracy becomes a "will-o-the-wisp," production slows down. The simple fact of size is the main handicap. And few large parts are produced in quantities large enough to justify mass production.

The goal in machining large parts, such as steam-turbine rotors, is to set them up once and not move them again until the work is completed. But a versatile machine tool is needed for such an operation, and few such machine tools are available.

Innocenti-BWM (Milan, Italy) has developed a "building-block" approach—beginning with one basic machine and then adding special-purpose tools as required. The result is a fairly expensive and large machine, but one that Innocenti says can cut the machine-tool cost in half on a large workpiece compared with conventional machine tools.

Innocenti provides a large number of attachments and fittings, all designed to do different machining jobs when applied to the basic machine. Most potential users would not want all the attachments, but they are available if a machining job requires them. With the attachments, the machine can work several or all sides of a large workpiece, as well as many internal surfaces. And it can machine in any direction.

These are the basic parts of the machine:

—A large vertical column with wide ways on two faces where a number of slides and attachments can be mounted.

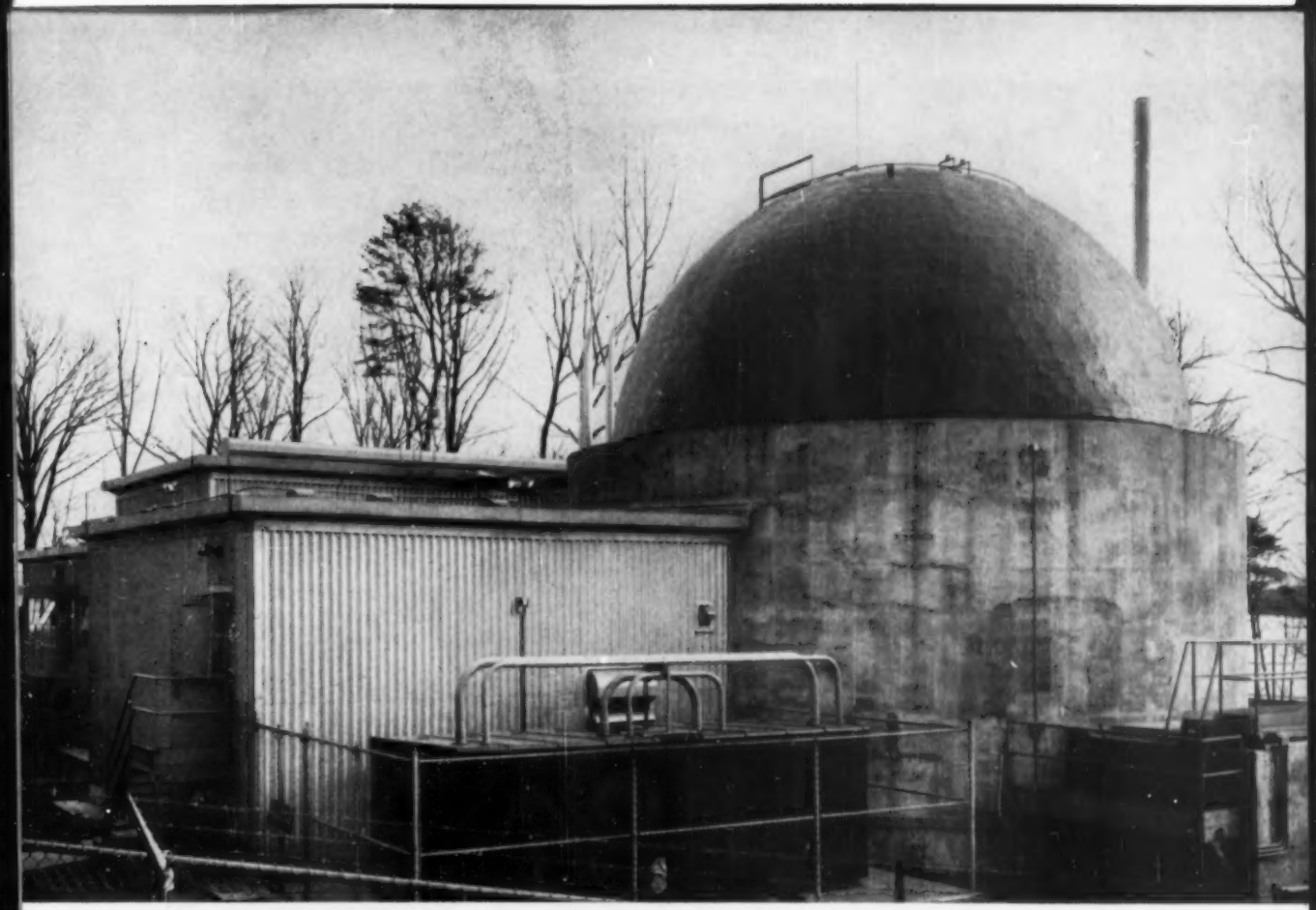
—A powered rotary table able to hold a large piece of work, and capable of indexing or angularly locating the work.

—A primary powered head that fits the vertical column, and which has tool spindles aligned in two directions.

In addition, there are several cutting heads, a reciprocating table, a large T-slotted baseplate that fits around the rotary table, and a special head with horizontal ways that can be extended over the work.

Headstocks are powered by 25, 40, or 60 horsepower motors; feed motions are stepless from 0.6 to 2200 millimeters per minute.

This array of facilities makes possible a workpiece set-up where the work may not have to be moved until completed. Set-up and handling time—important factors when the work is large—are drastically reduced. For all practical purposes, the machine can be built up around the work as required. One attachment may be used, then another put in its place to machine a different surface. ●



ALCO-built APPR is PWR design, generates 2000 kw. U. S. Army uses it to train personnel to operate planned similar atomic plants in remote areas.

NEW PWR ATOMIC PLANT: POWER FROM THE ATOM NOW

Army Package Power Reactor, built by ALCO, now generating power; forerunner of ALCO plants to 20,000 kw

The APPR is an atomic milestone. It was built by ALCO for the U. S. Atomic Energy Commission and the U. S. Army, and is generating useful power today.

ALCO's commercial atomic plant designs, to 20,000 kw output, are based on experience with the APPR. They incorporate insights drawn from the APPR's design and construction, but they are not experimental. They are ready to go to work producing economical power in fuel-short areas.

ALCO's own criticality facility, one of the first in world industry, will test specific PWR designs before costly installation, saving money and time.

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EVERY WEEK THE PLACE DE LA CONCORDE LEAVES FOR THE STATES...

RENAULT
RÉGIE NATIONALE

Of course, this statement does not imply that the Place de la Concorde is exported as such, with its obelisk marking the very center of Paris.

Rather, this applies to the 576 cars which are displayed on this photograph. This is exactly the number of cars exported to the U.S.A. every week by the Regie Renault.

And this is not the only export market: Europe, Africa, Australia, Asia also are eagerly waiting for their shares.

Dauphines are now operating all over the world highways.

In every country of the world, you will meet members of the Dauphine car owners family.

And 5.000 Renault dealers all over the world are ready to service the Dauphine.

The ideas below, culled from the experience of American manufacturers, are samples of what can happen when managers start to think about reducing production costs. Read them carefully: One may apply to your business.

Cost-Cutting: 44 Short Stories

Digested from FACTORY MANAGEMENT & MAINTENANCE, Aug,p88

Assembling. Mounting axles on conveyor line moving through three stations saves $53,000 a year in assembly costs, cuts time 57%. Formerly each of three men completely assembled axles at separate stands.

Reclaiming. Expensive tumbling-barrel chips were scrapped after use. Now they're washed down over a vibrating screen at rate of 2000 lb. per month. Expected to save an annual $5000.

Labeling. Box inventories are halved by replacing preprinted boxes with preprinted labels. Stored by size only, boxes are labeled as they are used. Electric dispenser feeds the self-adhesive labels.

Shipping. Packing costs of fractional horsepower motors cut 60% by packing 80 to 100 in single cartons with cardboard dividers. No other packing needed. No individual cartons.

Stitching. Screwing together aluminum window frames cost 81.4¢ apiece. Screws protruded, builders complained. Now metal stitcher drives staples through head, sill, jambs. Does better job for only 0.099¢ per window.

Assembling. Replacing individual jigs, "lazy susan" rotating multiple jig speeds up assembly of electronic parts 40%. Operator spins jig, completes same operation on each assembly.

Stamping. Costs were halved in making metal trays by using precoated sheet metal coil and a combination die for piercing, notching, and cutting off. New method eliminates cleaning, spraying, baking trays, slitting sheets, and stacking strips.

Coiling. Wire coming out of wire-stamping machine is coiled by receptacle. Coiler is pivoted on bottom, turns by action of the wire. Replacing hand coiling, device saves $3200 a year.

Soldering. Problem: Remove wires' plastic coating before soldering. Solution: Substitute electrodes for iron. Heat melts plastic, bared wires close circuit. Solder completes job 100% faster.

Palletizing. Flattening bags before stacking them gives more stable tiers, cuts material loss $1150 yearly. Bags are raised on lift until they are pressed flat against a projecting shelf. Cost, $250.

Core-baking. Three old batch-type ovens required a tender each. Core-makers now load work on conveyor that runs into single oven with only one tender. Baking time cut—drier sand used.

Washing. Cleaning bell-jars under a faucet was expensive—they cost $58 apiece, often slipped and broke. Inverted spray with foot pedal frees both hands for holding. Cost $90, has saved $600.

Gate keeping. Using remote control set-up, typist replaces full-time gatekeeper. Press of button opens, shuts gate. Two-way squawkboxes link truckers, girl, and receiving room. Total outlay: $1780.

Separating. Using law of physics boosts production 15%. Problem: Separate galvanized sheets for loading into machine. Solution: Use magnets to induce positive charge in sheets. Top sheet, repelled, rises into air.

Loading. Loading parts on racks, pushing into ovens meant costly rehandling. Labor cut an annual $3400 by loading lightweight trucks in production, rolling into ovens. System paid for itself in one year.

Greasing. Holes in plastic insulators greased one at a time with brush. Brush dipped in grease for each hole. Labor slashed 61% by placing insulator over grease fixture with attachments for multiple holes.

Gouging. Cut costs 80% on metal removal jobs (like gouging out old welds, removing tank lining plates). Electric torch does the trick. Air jet blasts slag from arc point, leaves work clean enough to reweld.

Assembling. Using hydraulic ram instead of hand mallet in assembling rollers and bearing races to belt idler shaft cut time from 3 hours to 22 minutes, a saving of 87%.

Tooling. Increase tool life nine times by putting carbide inserts in trim blocks. They trim over 100,000 pieces between grinds (compared to 12,000 using high-speed steel) and require little grinding.

turn the page for more cost-cutters

More short stories about cost-cutting

(story begins on preceding page)

Sorting. Different kinds of balls must be packed in right proportions. Presorting speeds job 20%. Bucket conveyors lift balls at adjusted speed from hoppers, dump on belt in proper proportions.

Timing. Eighty-four manual heliarc welding stations consumed $120,000 in argon per year. Bill sliced 32% by automatic timers and micro-switches. They cut off gas and water after operator breaks arc.

Honing. Hand-honing tiny cam shafts produced only 10 an hour. Now cam shaft is held in chuck and rotated. Hones ride on faces as cam turns, honing all sides. Production now is 40 shafts an hour, better quality.

Painting. Problem: Paint bedsprings faster without speeding up conveyor or adding another. Solution: Put two-way hooks on conveyor, load it from both sides, thus doubling capacity.

Nailing. Nailing machine (cost: $20,000) and three men turn out 90 bed frames an hour. Hand nailing took five trained men to assemble 18-piece frames. Machine is adaptable to different frames.

Spot welding. Mirror on spotwelding machine saves $15,000 yearly by cutting down rejects on floor panel operations. Operator sees both ends of the work, thus avoids over-shooting spotweld strip.

Air conditioning. When a hosiery plant installed air conditioning one August, daily output of hose leaped from 225 to 444 dozen pair first day. Over a longer period, production increased 29%, and maintenance dropped 80%.

Bundling. Securing bundles of wooden factory stakes with "Ty-ups" (which is name for special wire hooks) instead of with twine, saves 17 man-hours in two weeks, cuts twine costs 80%.

Sealing. Job: Seal together parts with Alemite 125. Brushing it on, two women turned out only 500 units a shift. With new pump and control valve, one woman turns out 1500 units. Material costs cut $270 a week.

Welding. Time on welding circular seamwelds is cut 80% with $14,000 rollwelder. It's operated by one man, replacing seven spotwelders and their machines, which cost $49,000. This new method cuts job from four hours to 45 minutes.

Dust proofing. Cleaning machines after storage cost $3 to $10. Protecting them with made-to-order plastic covers cuts costs to 35¢ per machine. Covers cost $3.50 each, are good for about 10 uses.

Positioning. Work positioners boost production 10 to 15%. Calibrated spring mechanism raises load platform as top part is picked up. Operators have steady supply of parts at best work level.

Drilling. Drilling and counterboring thermo-plastic knobs caused heating, clogged holes. Four girls had to hand-clean knobs. Rejects were high. Now deep-freezing knobs before drilling ends problem. Freezer pays for itself in eight days.

Insulating. Snap-around thermal insulation of pipes cuts labor costs 20%. One man can install it. Comes in 6-ft. lengths, costs about the same as other types. It's moisture-proof and salvageable.

Salvaging. Protective coating stripped off airplane sections is reusable. Aluminum coldspray is dissolved in methyl ketone, applied to wing sections to protect them against abrasions. Saves $1800 yearly.

Packing. Gluing packing-crate edges with new set-up saves $935 yearly in labor. Plate, submerged in glue tank, rises when lid is lifted, presses against crate edge. It's faster, neater than brushing glue on.

Fueling. Operating 120 tractors and forklifts with propane instead of "gas" saves $40,000 yearly: 60% cheaper, better mileage, 85% fewer oil changes. And fewer overhauls. Change cost $22,000.

Spinning. Cutting waste motion in spinning nuts onto bolts increases output 27%. Formerly, single spinning jig left one hand idle. Two jigs, nut and bolt piles arranged to suit, now do the trick.

Finishing. Plating parts by dipping basketfuls in tanks was bottleneck. Lack of agitation caused uneven coverage, reruns. Rotating hexagon-spade barrels replace baskets, pare costs 45 to 66%, time 80%.

Cooling. Cooling hydraulic oil caused waste of water on plastic-molding machines. Mechanical flow-rate control and automatic shut-off valve, installed on 23 machines, cost $397, cut water use 66%.

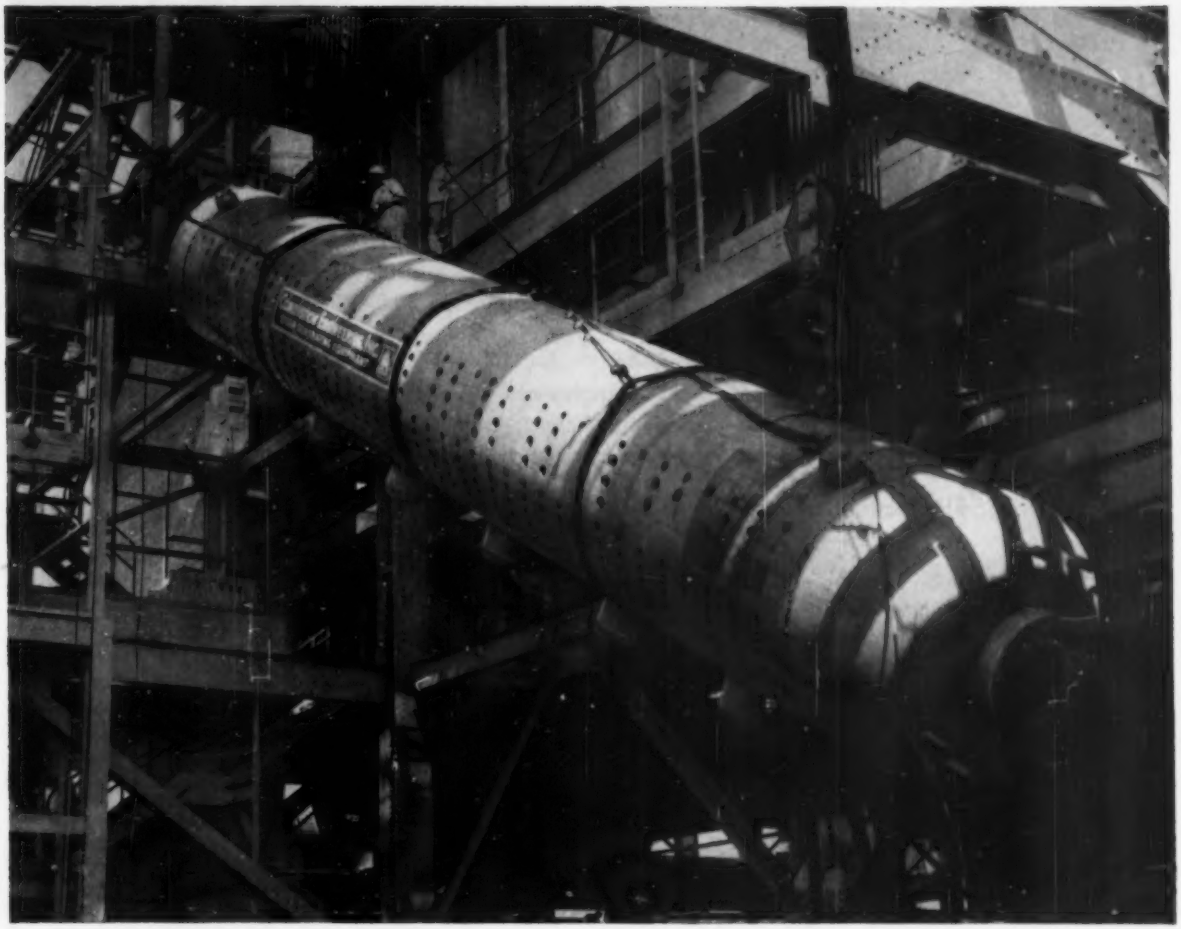
Machining. Workers, one to each machine, fed bolts into collets one at a time, sometimes missed cycles. Today automatic five-spindle loader tended by only one man saves labor and cuts cost 53%.

Unloading. One man can unload 10 tons of chemicals per hour, feed into any of 24 bins. Airveyor (combination vacuum conveyor and traveling crane) costs $36,000, requires almost no maintenance.

Policing. Television spots roof fires. Two TV "eyes" replace four full-time guards. Regular fire-reporting operator scans screen, controls cameras. Maintenance nil. Costs $20,000, saves $21,000 wages yearly.

Counting. One girl does the work of 38 in counting and sorting lemons, thanks to electronic counters. More accurately, too. Result: slashed labor costs, no more overpacking.

Rust Proofing. Parts rusted in storage, requiring greasing, degreasing. Dehumidifying storage area (cost, $41,000) yields rust-free parts. Annual saving was $55,000. ●



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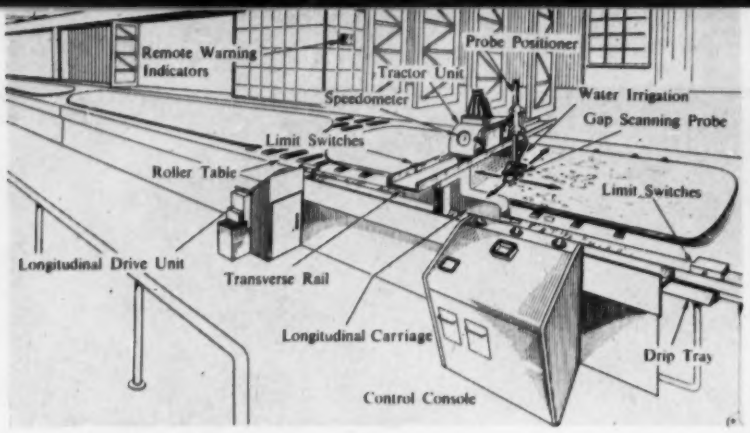

ULTRASONIC PROBE (right) makes fast work of testing in a plate mill

Ultrasonic Tester Joins the Production Line

Digested from PRODUCT ENGINEERING, July,p203

"Autosonics" is the name of this new ultrasonic testing technique, developed in Britain by Kelvin & Hughes, Ltd., London. It is reported to be automatic, non-destructive, and fast—faster than existing methods. An inspection speed of 30 meters per minute will pick up the tiniest defects; gross defects can be spotted at a scanning speed of 120 meters per minute.

The likeliest application of the Autosonics technique is in a steel plate mill, where it would form part of the production line (picture, above). But there are other possibilities. One advantage: Autosonics makes permanent records of each test.

Autosonics is based on the "pulse-echo" system of inspection —using a high frequency sound beam to detect flaws. An inspection probe, making contact with specimen material by a liquid, transmits the sound into the material as a sequence of energy pulses. When the pulses reach the opposite face they are reflected back

ANNOUNCING

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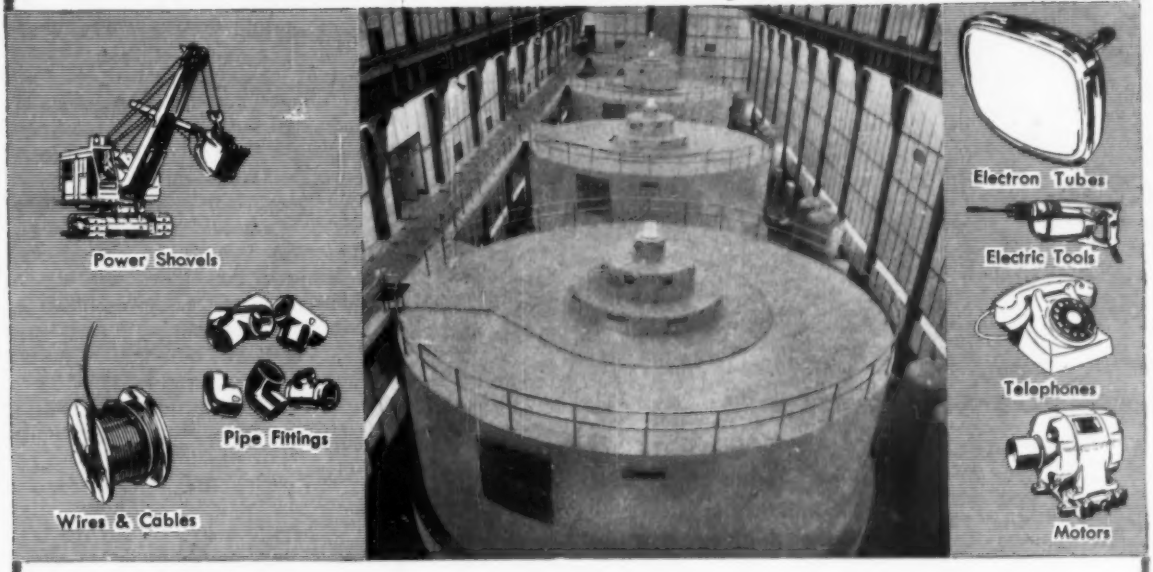

Pictures show the most powerful group of generators in Japan, installed at the Sakuma Power Plant. Each unit driven by a 100,000 kW Francis Turbine yields 93,000 kVA of electric energy. The two units in the foreground, complete with turbines, have been supplied by Hitachi, Ltd.

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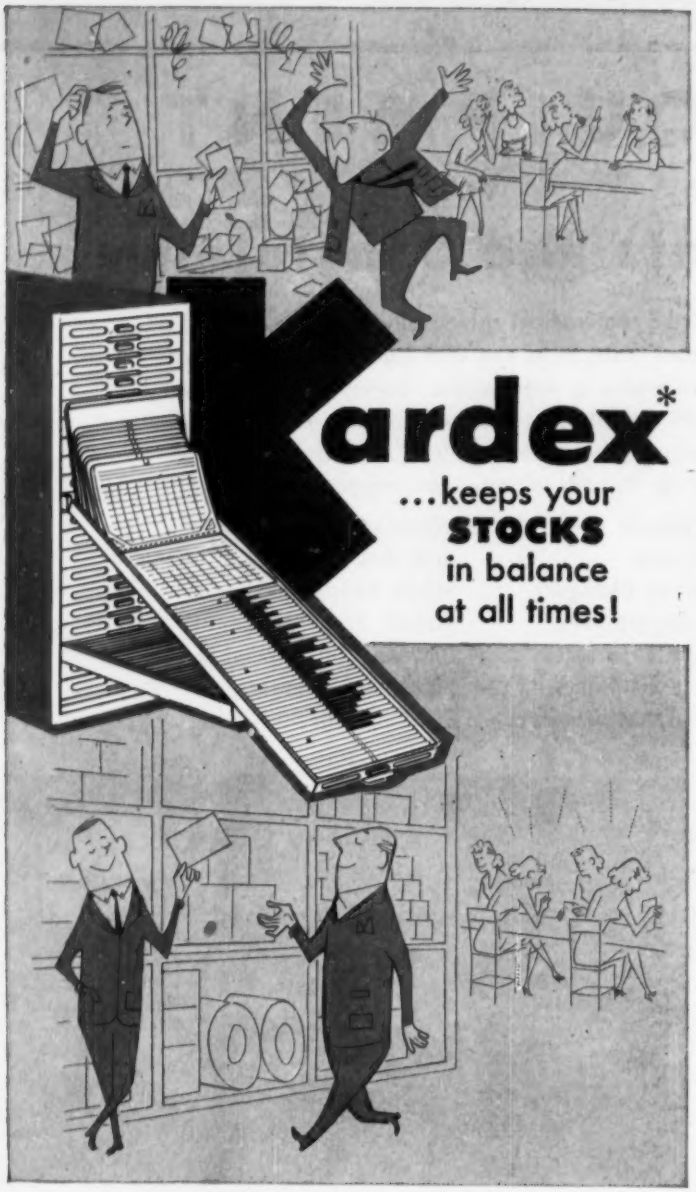

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to the probe; time required depends on the velocity of sound in the material and its thickness.

Gap testing is the procedure used. A very small distance—filled by liquid from an irrigation system—is maintained between probe and specimen. An automatic flaw alarm and recorder can be adjusted to respond to defect signals in a section or in a narrow strata anywhere in the cross-section.

Sensitivity can be adjusted: Autosonics will respond to small or large flaws, and will ignore those which are less than the preset level. The output can be used to operate various recording systems, and will provide a plan position indication of any defects present in the material. ●

New Family of Glossy Paints?

Water-based latex paints are usually flat, luster-less. Ever since these paints first appeared, chemists have tried to give them a bright, glossy finish.

It looks now as if the chemists have succeeded. Researchers at Celanese Corp. of America have a formula that yields a water-thinned latex paint of 75 to 85 gloss units (on a scale of zero to 100). The paint is based on an emulsion technique that may well be the foundation of a new family of paints; Celanese people even suggest that all automotive paints may be water-based by 1956.

The process involves special wetting agents, protective colloids, and extremely fine particles of polyvinyl acetate resin of proper molecular weight in the emulsion. The particles are so minute that 31,500-million fill no more space than a pin-head. When formulated into paint and stored in the can, the particles do not touch each other. When the paint is applied, the water in which the resin is dispersed evaporates, and the particles fuse into a tough, glossy finish.

Several U.S. paint-makers have begun producing glossy paints using the Celanese emulsion. (*Chemical Engineering, August, p*182)

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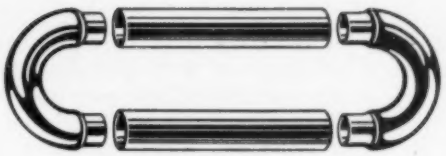

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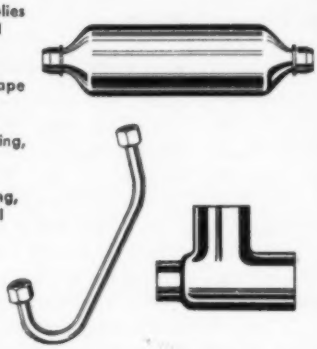

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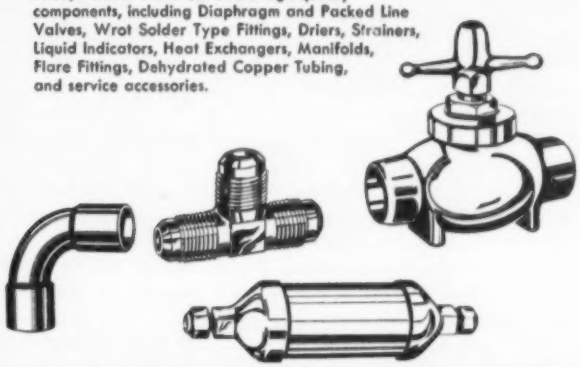

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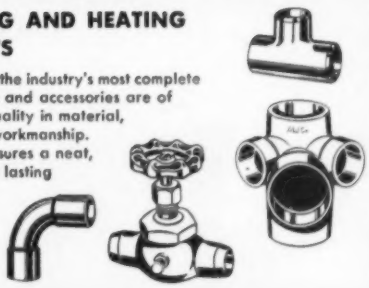

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Looking Ahead in Technology

● **THE FLOOR of brackish Lake Maracaibo, Venezuela, will be criss-crossed with 36 kilometers of aluminum pipe,** carrying crude oil from offshore wells to flow stations for Creole Petroleum Corp. A test pipeline laid two years ago has proved aluminum's resistance to the lake's waters.

● **TINTED HIGHWAYS may be the answer for the bewildered motorist in unfamiliar territory.** West German road specialists are working on a plan to add dyes to paving material before it is applied to the road surface. One chemical firm has already marketed a product called "white asphalt," which can be used for permanent highway surface markings, eliminating repainting. (*Fleet Owner, Aug, p92.*)

● **"FREEZE GRINDING" may be the way to grind materials such as rubber and plastics.** British Oxygen Research & Development Ltd. grinds nylon and polyvinyl chloride to a powder in stainless steel, high-speed hammer mill. Particles cooled by liquid nitrogen in a heat exchanger make up the hammer-mill feed. In the past these materials could not be ground up because the heat generated caused molecular degradation. (*American Machinist, July 29, p129.*)

● **TWO PROCESSES for direct reduction of iron soon may go into commercial use.** The H-iron process (MD, June '56), developed by the U.S.A.'s Hydrocarbon Research and Bethlehem Steel Co., removes oxygen from finely powdered ore, using hydrogen as the reducing agent. A likely location for the plant is Seattle, Washington, where Bethlehem has new electric-furnace facilities. But Venezuela is also mentioned—hydrogen supplies would be relatively cheap and plenty of ore is nearby. The other process, sponsored by Republic Steel Corp. and National Lead Co., uses a rotary kiln and low-grade fuel to remove oxygen from pulverized ore. A plant will soon be built.

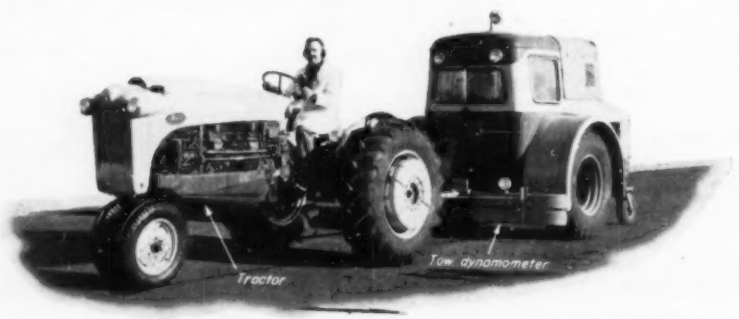
Meanwhile the British Iron and Steel Assn. will make a small-scale pilot-plant tryout for its Cyclosteel (MD, Jan, p8) process. It takes fine droplets of liquid iron ore and blows them through a mixture of oxygen and powdered coal. A cyclonic reactor will be used. (*Business Week, Aug 3, p34; Chemical Week, July 27, p71*)

● **A TELEVISION PROBE will make direct studies of geological soil structures** in small borings up to 300 meters deep. The probe was developed by Grundig Radio-Werke GmbH. (Fuerth, Bavaria), and can be used in bores as small as 6.25 centimeters in diameter. The probe is not affected by water or the straightness of the bore. The picture taken by a miniature camera inside the probe is transmitted by cable to ground level. (*Electronics, Aug 10, p42*)

● **PLASTIC PIANOS may not be far off.** Pleyel of France, famous maker of pianofortes, is now putting plastic actions inside its products. By subtituting a polyester-based plastic for wood, the manufacturer has reduced from 75 to 62 the number of pieces used to control each key. Plastic has the added advantage of not warping or shrinking like wood, so that the piano can be kept in good playing condition in extreme climates.

● **THE MITSUI CHEMICAL CO. (Japan) plans to synthesize acetylene and methanol** from natural gas available locally. Other products will be phenol resin and vinyl chloride. This will be Japan's first attempt at production of synthesized acetylene; similar processes are operating in Italy and the U.S.A.

● **A DRY BATTERY with a 10-year life expectancy features a cell that can be recharged for years** and still maintain a constant output. It has a capacity of 1½ ampere-hours and is about as big as a man's wrist watch. The U. S. Naval Ordnance Laboratory did development work; suggested applications include transistor circuits for hearing aids, portable receiver-transmitters, air navigation systems, and portable radios. (*Product Engineering, Aug, p9*)



● **A FREE PISTON turbine engine tractor is now being tested.** Exhaust gases from a free-piston gasifier drive a turbine in this Ford Motor Co. tractor design. The turbine runs at speeds up to 43,000 revolutions per minute and can develop over 100 drawbar horsepower. Ford believes the high horsepower

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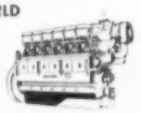

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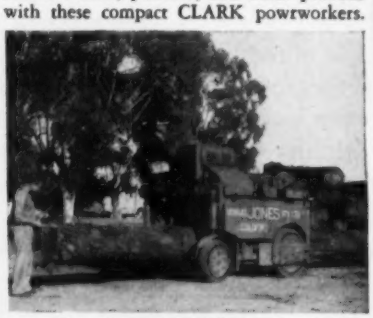

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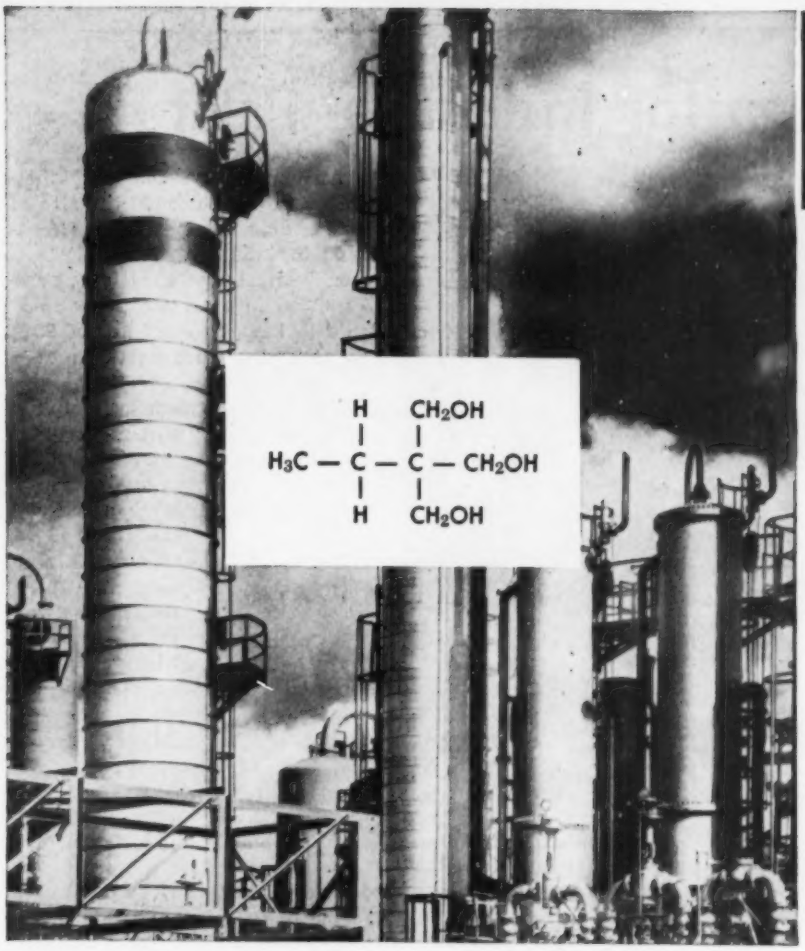
Associated Manufacturers in Australia, Belgium, France, Germany and U.S.A.

and starting torque suit the engine for agricultural work; beyond that, the engine is easily maintained, and capable of operating on a wide range of fuels. The tractor is strictly experimental, and not scheduled for production. (*Product Engineering, July, p*154)

● **A NEW COTTON-BLEACHING PROCESS will soon be offered to the textile industry** by the U.S.'s Solvay Process Div., Allied Chemical & Dye Corp. It is an activated "hydrogen peroxide" process that involves prebleaching with specially prepared hypochloride. That is followed (without washing) by bleaching with reduced quantities of hydrogen peroxide and other chemicals for a shorter period of time than that used in conventional methods. In addition to reduced bleaching costs, the process is said to produce higher brightness, brightness retention, purity, absorbency, and dyeability. (*Chemical Week, July* 27, *p*82)

● **BETTER METHOD of plating steel with titanium carbide** has been developed by Metallgesellschaft AG (Frankfurt, Germany). It is based on an older technique using the reaction of titanium tetrachloride with hydrogen and a hydrocarbon, but operates at a lower temperature—960°C—to allow vapor plating without loss of the steel's properties. Drawing dies, tube and wire drawing mandrels plated in this way have proved superior to those plated with hard chromium. Plating and material cost is about the same (*Metalworking Production, Aug* 9, *p*5)

● **A SMALL, turbine-type engine may reach an efficiency of 80%,** according to the Kollander Engineering Co. (Albuquerque, New Mexico, U.S.A.). Combustion takes place in the rotor instead of in a combustion chamber. This "reactor engine" operates on the principle of other gas turbine engines, except that the higher efficiency is achieved by combustion of gases at constant volume as opposed to constant pressure. Present plans call for the engine to weigh 79 kilograms, develop 285 horsepower at 2000 revolutions per minute, and burn diesel fuel or fuel oil. (*Product Engineering, Aug, p*202)



See your representative listed below for: Plastics, Polyester Resins, Chemicals, Textiles, Cellulose Acetate.

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Austria, Vienna XIX . . . Eugen Farber . . . Chemicals, plastics, resins, C. A. & textile products.
Belgium, Brussels . . . Keyser & MacKay . . . Resins.
Belgium, Gand. . . . Cocentra S.P.R.L. . . . Chemicals, plastics & C. A.
Denmark, Copenhagen . . . . . Johan Foge Jensen . . . Chemicals.
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Japan, Tokyo . . . A. R. Brown, McFarlane & Co., Ltd. . . . Resins.
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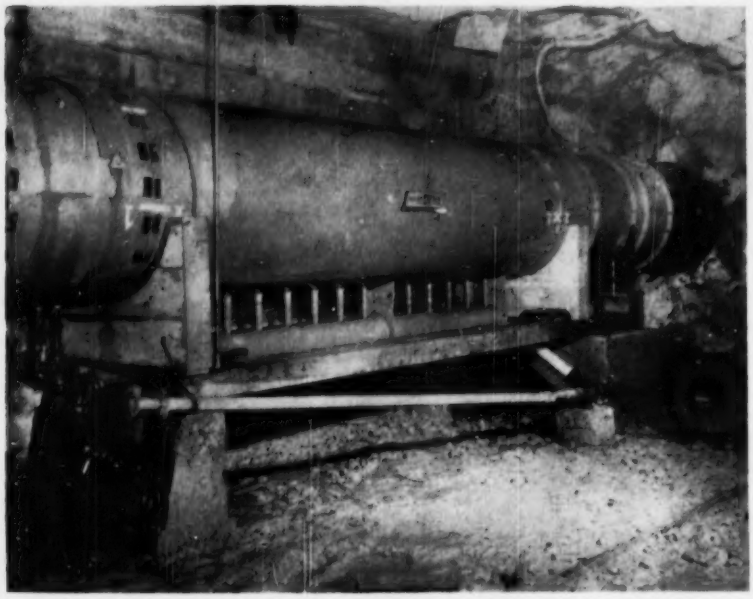
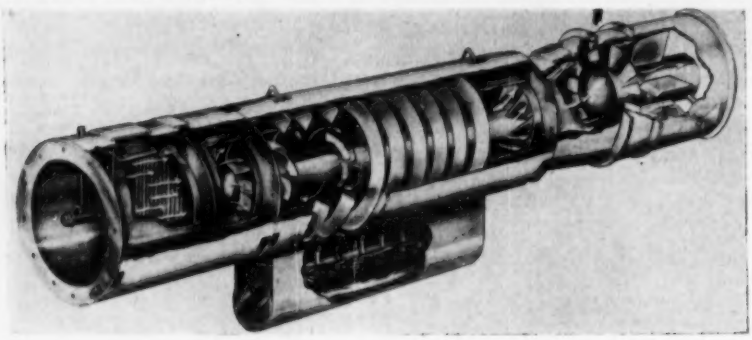
AMCEL CO., INC., 180 MADISON AVENUE, NEW YORK 16, N. Y.
AFFILIATE OF CELANESE CORPORATION OF AMERICA

New Weapon for Industrial Dust



ABOVE: Unit has same external structure as section of ductwork. Here it is being used underground to safeguard ventilation, recapture valuable materials.

BELOW: Air enters mixing section (left) for impingement, then passes through vanes of water eliminator. Clean air is blown out by fan at far right.



An unusually compact dust-collector, 1/10 or 1/20 the size of comparable equipment, is available to industry. The unit is a wet, inertial type small enough to be fitted into an airduct, and is said to have an efficiency of 99% in collecting dust particles of 5 microns or more.

Two essential parts make up the unit: mixer and eliminator. The dust-laden air or gas enters the unit at its mixer section, where impingement takes place. Each particle of dust is enveloped in water as it goes through a fine spray. Air and dust then pass through turning vanes on the way to the eliminator section, where they are separated by centrifugal force. Then the dust-laden water is captured in blind louvres connected to a disposal sump below the unit while the cleaned air passes through straightening vanes, an axial fan, and out.

"Microdyne" dust collectors have been built in sizes from a 500-cubic feet per minute unit (6 feet long, 8 inches wide) up to a 48,000 cfm unit (25 feet long, 4½ feet wide). The maximum available size will be 64,000 cfm.

The compactness of the collector will favor the use of multiple units, each located near the source of dust. Several are now being used in U. S. coal and metal mines. **Joy Mfg. Co., Henry W. Oliver Bldg., Pittsburgh 22, Pennsylvania, U.S.A.**

Truck Totes in Bulk, Delivers in Bags

Bulk deliveries of coal, chemicals, and foodstuffs can be made more economically with this new vehicle. The truck is equipped with a conveyor to discharge its load and an automatic push-button sack-filling and weighing mechanism at the rear chute. There is also a scale for the customer to check the delivered weight against the order, a counting mechanism to record individual and total deliveries, and a hydraulic lift to facilitate manual unloading. **Charrold Ltd., Tower House, 40 Trinity Square, London, E.C.3, England.**

Automatic Duplicator

Just ten seconds are needed for the "Copyer" Duplicator, model F-12, to print copies of an original sheet. The unit operates by itself through the process of making as many copies of an original as desired—without noise or odor. The original is placed on a piece of "Copyer" sensitive paper, fed into the machine, and within a few seconds is printed by a 600-watt mercury arc lamp and developed in a special tank which forms part of the unit. Drying is done by a bladed fan powered by a 1/75 horsepower motor.

Speed of performance is controllable, and varies from 83 to 1,500 feet per hour. **Maruboshi Machine Industry Co., Marunouchi Building No. 292, Marunouchi, Chiyoda-ku, Tokyo, Japan.**

PHOTOGRAPH OF NEIGHBORLY NETHERLANDERS. FROM THE PEPSI-COLA INTERNATIONAL PANORAMA MAGAZINE

Pepsi-Cola is there—*helping to pass the time of day in The Hague and in Havana. Four hundred million people have made friends with "Pepsi." In whatever part of the world a Pepsi-Cola bottling plant rises, the standard of living and enjoyment of living rise along with it as well.*

Pepsi-Cola International, 3 West 57th Street, New York 19, N. Y., U. S. A.

Colombian National Railways orders 18 General Electric locomotives for new transcontinental rail system

In a modernization program, the Colombian National Railways has begun construction of a rail system that will link Bogota, Colombia's capital, with the Pacific Ocean and the Caribbean Sea. Eighteen General Electric locomotives have been ordered for service on this transcontinental rail network.

The new Model U12C locomotives are 1200-horsepower universal type diesel-electric units with dynamic braking. They will be used initially for through-freight service on the Atlantic route.

Five other G-E 1200-horsepower locomotives have been in use since 1952 on the Pacific route. General Electric diesel-electrics were chosen because of their versatility, greater tractive effort and higher horsepower ratings than other locomotives of the same general type.

Learn how G-E diesel-electric locomotives can help increase the operating efficiency of your railroad. For complete information without obligation contact your nearest International General Electric Company representative.

(135-E12)

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Portable Recorder

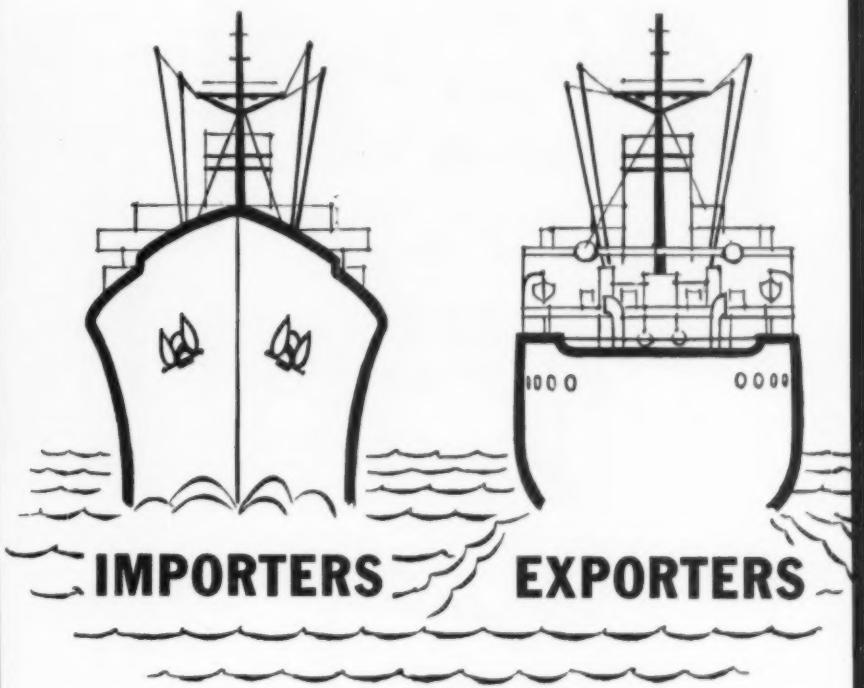
Businessmen can use this self-powered recorder to record interviews, conferences or dictation at their desks, or as they walk, ride or fly. It is a lightweight machine with no wires, no warming-up period, no exposed microphone; and the manufacturer claims it can function inside or outside a closed briefcase and from a distance of 60 feet, with a minimum of surrounding noise interference.

"Sonaband" discs are provided with the machine, which will record on each side continuously for up to 4 hours.

An unusual feature of the recorder is its start-and-stop provision: As soon as the voice speaks over the microphone or telephone the recording begins, and then stops automatically about 8 seconds after the voice has ceased. This eliminates supervision, and wasteful recording of silent periods. **Miles Reproducer Co., Inc., 812 Broadway, Dept. JM, New York 3, New York, U.S.A.**

Multi-Purpose Drilling Tool

A novel table drilling, tapping, and milling machine has been developed which has a drilling capacity of from zero to 6 millimeters (¼-inch). The manufacturer describes the tool as "the small plant's answer to automation", combining cheapness with



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Printmaster 810—Moderately priced whiteprinter for finest large-volume production. Synchronized developing and printing. Electronic fingertip controls. For prints from originals up to 42" wide (107cm) at speeds up to 40' (12.2m) per minute.

ANTARA O-M—Desk top model with many of the fine features usually found only on larger machines. Small in size, yet provides large-volume capacity. For copies and prints from originals up to 16" wide (41cm) at speeds up to 30' (9.14m) per minute.

Bambino—Low in cost and extremely economical to operate. No larger than a typewriter. Can make 200 copies an hour from originals up to 9" wide (23cm) or from 8' to 10' (2.5 to 3m) per minute on continuous roll stock.

ANTARA SAVES TIME!

Now you can make *all* the copies you need *in just seconds* with the versatile ANTARA copying process. This method produces copies or prints of reports, charts, drawings, graphs, forms, letters, etc. . . . *anything* that is typed, written, drawn, or ruled on paper that is translucent (lets light through).

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Exact copies of originals cost less per copy than the price of your daily newspaper. They can be produced in colors, and on a variety of materials . . . paper, cloth or foil. And there's no need to buy carbon paper, duplicating inks, stencils, processing tanks, etc.

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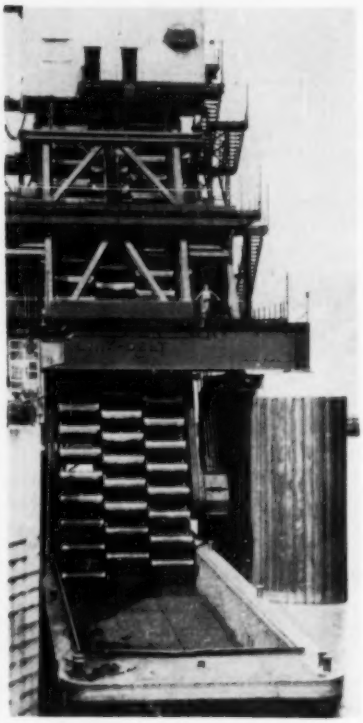
Anyone can use ANTARA. Just put in the originals, and out come the clear, dry, legible copies. There is *less* re-writing and re-typing . . . *never* any proofreading or corrections to be made. Confidential material can be deleted, or additional information can be added to any correspondence by merely changing the original. *Every* efficient organization should have an ANTARA machine . . . and there's a model that's exactly suited for *your* needs!

ANTARA representatives are located in all principal cities of the world. Write direct for further information, which will be airmailed to you promptly by: ANTARA, Diazo Division, General Aniline & Film Corporation, 435 Hudson Street, New York 14, New York, U.S.A. Please address Department 10K.

MORE PRODUCT DIGEST

versatility. With its automatic feed disc the machines can be used for precision engineering purposes—making ball point pens, typewriters, sewing machines, precision tools, and electrical goods. It can be accommodated to ten different operations. **A. Hauser & Co., Metallwaerenfabrik, Gosheim, Wuerttemberg, Germany.**



Buckets Scoop out Coal from Barges

This "Big Scoop" barge unloader is designed to empty a 900-ton coal barge in less than half an hour. It consists of three endless lines of bathtub-size buckets, each of half-ton capacity, which scoop out the coal as the barge passes underneath. The machine is operated at the press of a button. **Link-Belt Company, Prudential Plaza, Chicago 1, Illinois, U.S.A.**

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A new electrical counter will record the actual times run by engines, motors, machines, and other

CHAIN BELT *quickens the pace of progress*

CHAIN Belt Rex Roller Chains transmit power on this department store moving stairway.

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Whether it's a moving stairway to move people from one floor to the next...a bucket elevator in a cement mill...or a conveyor in an industrial plant, CHAIN Belt chains, sprockets and bearings quicken the pace of progress...cut the cost of operations.

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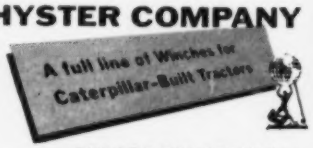

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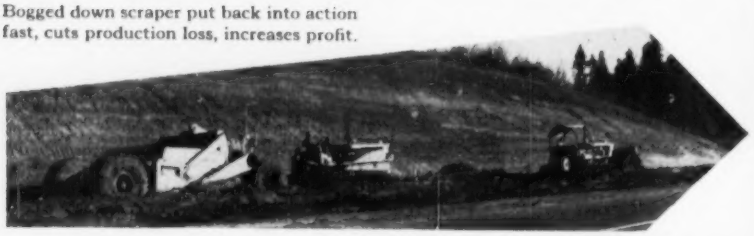
Factories: Portland, Oregon; Danville, Illinois; Peoria, Illinois; Nijmegen, The Netherlands

Bogged down scraper put back into action fast, cuts production loss, increases profit.



Tough bulldozing jobs like this are possible with steady, reliable Hyster winch power.

Higher production is possible when other machines get assistance from tractor-mounted winch.

Caterpillar and Cat are registered trademarks of the Caterpillar Tractor Co.

equipment without being affected by temperature changes or by stray magnetic fields. The counter, called the "Horacont", is driven by a self-starting synchronous motor. Both the motor and counting mechanism are built into a dust- and dirtproof metal housing. Easy reading is assured by clear figures, each almost ¼-inch high. **Kontrolluhrenfabrik Julius Bauser, Empfingen, Horb/Necker, Germany.**

Lightweight Seismograph for Subsurface Exploration

This 16-pound refraction seismograph is designed for subsurface exploration to a depth of 50 feet.

The electronic techniques of transistors and printed circuitry are used to measure the time taken by sound waves to travel to and from bedrock or consolidated material. Sound source (either a hammer blow or explosive) and sound detector are located at the surface.

The instrument can be used to determine the depth to bedrock, the thickness of different material layers, and to classify subsurface materials without drilling. **Geophysical Specialties Co., 4206 Longfellow Avenue, Minneapolis 7, Minnesota, U.S.A.**

Moving Bulk Materials in Confined Spaces

A small diesel-powered loading shovel of 10 hundredweight capacity has been produced for bulk materials handling in factories, foundries, warehouses, and ships' holds. Drive is transmitted

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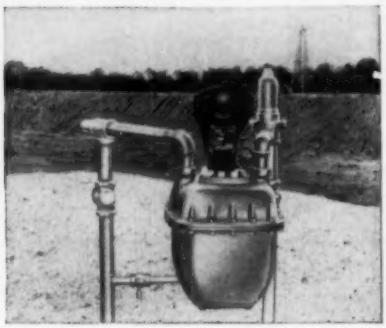
News of ROCKWELL

NEW DERRICKS rising daily mark encouraging progress in the race to keep supplies of petroleum and natural gas in balance with the world's growing demand. And everywhere in the world where oil and natural gas are produced you see increasing numbers of Rockwell-Nordstrom valves, Rockwell liquid and gas meters, and numerous other Rockwell products. Over the past half century oil field men have learned from experience that the name Rockwell is their guarantee of quality, accuracy, and longer life at lower cost. An illustrated catalog is now available—see your distributor or write Rockwell International Department for your copy.

NEW WELLS equipped with Rockwell-Nordstrom valves are a common sight from Arabia to Venezuela. These valves insure fast, dependable well head flow control because they are lubricant sealed for positive shut-off, and pressurized lubricant eliminates sticking. Rockwell-Nordstrom lubricated plug valves are available in the world's most complete line of pressures and sizes.



LARGE CAPACITY gas measurement is accurate and economical with the Rockwell "1600" gas meter shown above. Constructed of durable aluminum alloy with single joint construction, this meter is weatherproof, leakproof and easy to handle. Rockwell has a gas meter for every measurement need from domestic services to large capacity gas field installations.

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through an 11-inch diameter dry single-plate clutch. The machine is hydraulically operated by a vane-type pump which provides a working pressure of 1,000 pounds per square inch.

An automatic cut-out prevents damage to the system from an overload, and both rams and pipes are totally enclosed to reduce the risk of accidental damage during operation.

Maximum operating height, depending on scoop size, is from 10 to 11½ ft; maximum forward reach from 3 feet 2 inches to 4 feet 10 inches. **F. Perkins Limited, Peterborough, England.**

Copies Books, Files

Book pages, files, or single sheets can be copied instantaneously by this machine—without the necessity of removing pages and with no loss of margin. The improved unit, a combined exposer and printer, makes dry, positive copies up to 8½ inches by 14 under normal light or the brightest fluorescent light.

A sponge-rubber cushioned head adjusts to the thickness of the book to provide even pressure on the surface of the copy. The manufacturer says that the machine will pick up all print as well as writing in pen, colored pencil, or spirit duplication. An automatic timing device provides accurate exposure for each copy. After exposure the negative is run through the machine's built-in developing unit for the permanent positive copy. **Develop K.G., Stuttgart, Germany.**

For very particular people... B.O.A.C. of course

World's finest airliners...Britannias, DC-7Cs and Stratocruisers

Here drawn up on the tarmac at London Airport are airliners belonging to the three most splendid fleets in the world—*all of them B.O.A.C.!*

The revolutionary B.O.A.C. *Britannia* (*right*) has already won universal acclaim as the world's fastest, smoothest and most spacious jet-prop airliner. On the *left* of the picture, you see B.O.A.C.'s magnificently fast new *DC-7C*, first airliner to link the Old World with the New by regular non-stop flights. In the *centre* is the famous B.O.A.C. double-deck *Stratocruiser* — now sumptuously redesigned to offer you such *spaciousness* and luxury as never before. Always fly B.O.A.C. — world leader in air travel!

BRITANNIA services to South Africa, the East and Australia, Hong Kong and Japan; soon to U.S.A.

DC-7C services to New York, Boston, San Francisco, Detroit, Chicago and Montreal.

STRATOCRUISER "Monarch" services London-New York direct. Other services to Canada; to Bermuda, Bahamas and the Caribbean; also to West Africa.

Consult your local Travel Agent, or any office of British European Airways, our General Sales Agents.

Remember—it costs no more to fly by B.O.A.C.

BRITISH OVERSEAS AIRWAYS CORPORATION WITH S.A.A., C.A.A., QANTAS AND TEAL

Your local Dealer will be pleased to take you for a demonstration drive in the Prefect or Anglia. Take the family . . . they'll love it.

. . . a light-car leader. Soft, spacious seating . . . plenty of leg room . . . 10 cubic feet luggage space. 'Glide-Ride' suspension . . . front mounted 1172 c.c. motor . . . the two-door Anglia de Luxe . . . the four-door Prefect de Luxe . . . see your Dealer for details.

FORD MOTOR COMPANY LIMITED
ENGLAND

... and World-Wide Service too!

Compact Welding Gun

This light-weight resistance welding unit includes a water-cooled transformer as an integral part of the gun and can make up to 3340 spots per hour in 16-gage cold rolled steel. Placing the transformer close to the electrodes reduces losses in cables to roughly one-third the loss when it is mounted separately. **ARO Welding Machine Co., Villejuif, France.**

Interchangeable Table System for Projector

With a few adjustments, this Kodak Contour Projector, Model 14-6, is converted for either production-line optical gaging or tool-room measurement. The picture shows the flat staging table being placed into position after the removal of the movable worktable. The two tables may be purchased separately. **Optical Gaging Products, Inc., 26 Forbes Street, Rochester 11, New York, U.S.A.**

TAPES that SEAL

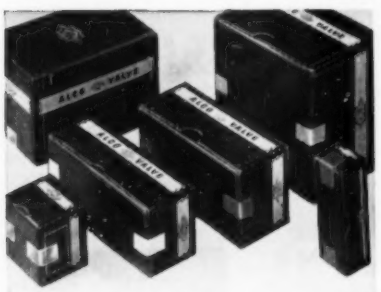
securely... economically

Nearly every product must be packaged in some way: in a can, bottle, tube, box or bag. Many such products need safe, positive seals to prevent loss or contamination. Many need seals that are decorative, as well as functional. And some demand only that the seal be tight-holding. All these requirements can be met—easily and economically—by one or more "SCOTCH" Brand Pressure-Sensitive Tapes. For full information about 3M Industrial Tapes write Minnesota Mining and Manufacturing Co., International Division, 900 Bush Ave., St. Paul 6, Minn., U.S.A.

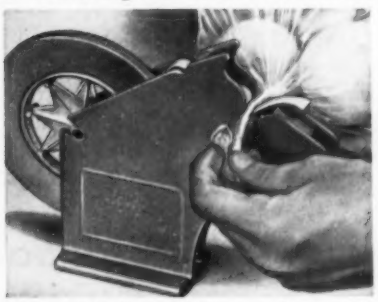
BETTER PRODUCTS
WORLDWIDE
THROUGH RESEARCH

REG. TRADEMARK
SCOTCH
BRAND
PRESSURE-SENSITIVE TAPES

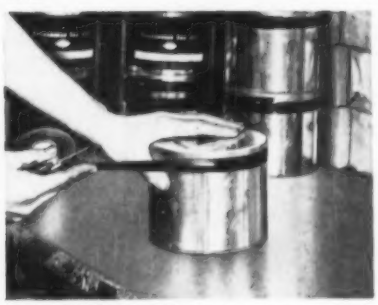
Look what you can do with it!



SEAL BOXES, decorate and code contents with one application of "SCOTCH" Brand Colored Cellophane Tape. Other tapes for heavier cartons, even shipping containers, also available.



SEAL BAGS quickly, easily with "SCOTCH" Brand Tape and P-37 Bag Sealing Dispenser. Simply twist neck of bag; insert into angled slot; press down; remove. Built-in cutter prevents waste.

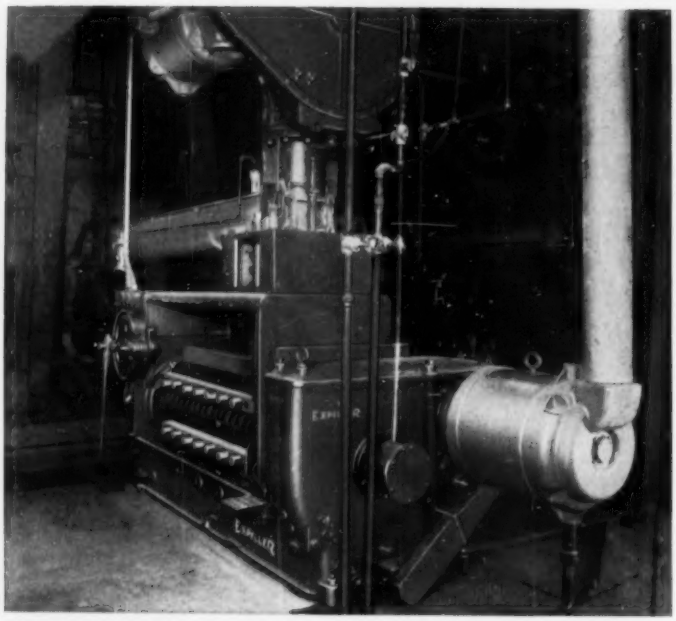


SEAL CANS, bottles, tubes, etc., with "SCOTCH" Brand Plastic Tape. Thin, tough, stretchy tape conforms easily; makes positive moisture and vapor barrier. Eight colors.

Made in U.S.A. by Minnesota Mining and Manufacturing Co., International Division, St. Paul 6, Minnesota

ANNOUNCING "The SUPER-DUO 55"

LONG BARREL EXPELLER®



NEW LOWS IN RESIDUAL OILS AT HIGH CAPACITY

Chart	Plant A Cottonseed	Plant B Peanuts	Plant C Flaxseed
% CAPACITY	51 tons per Day	49 tons per Day Farmer's Stock	550 bushels per Day
% MOISTURE	10.0	1.2	11.0
% OIL	2.84	3.2	3.17
% AMMONIA	7.98	9.63	
% PROTEIN	41.00	49.5	37.00
% NITROGEN	6.56	7.92	
% STANDARD	36	33	

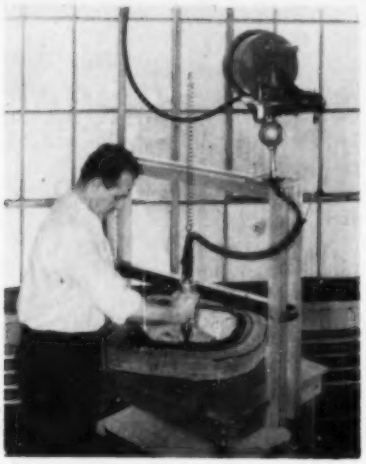
To the line of Anderson Expellers we proudly add the new Super-Duo 55, a long barrel Expeller that is producing cakes with unusually low residuals. This dynamic new Expeller is performing dependably with unusual results, as can be seen from the analysis shown here. If you are modernizing or expanding, be sure to write for complete information on the Super-Duo 55. Find out, too, how Anderson engineers can convert your present Expeller equipment to this new machine at low cost. Send for full details today.

THE V. D. ANDERSON COMPANY

division of the International Basic Economy Corporation

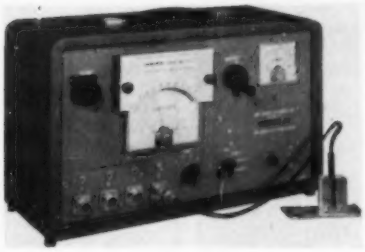
1962 West 96th Street • Cleveland 2, Ohio, U. S. A.

®



Tacks Driven Automatically by Air

Compressed air carries tacks from a hopper and feeding mechanism to a portable gun, then drives them into the work in this machine—the first automatic unit, the manufacturer claims, to drive low-cost tacks at high speed. The gun weighs 3 pounds and can handle machine-grade tacks in sizes from ½ to ¾ inch at rates of over 300 per minute. **United Shoe Machinery Corp., 140 Federal Street, Boston 7, Massachusetts, U.S.A.**



Checks Thickness of Metallic Coatings

The Dermitron model D-2 is a nondestructive, portable instrument for both laboratory and production use. It is designed to give fast and accurate readings of:

—metal coatings (e.g. plating) on a metal base.

—nonmetallic coatings (e.g. paint, anodizing, porcelain) on a metal base.

—metal films on nonmetallic bases (plastics, ceramics).

The instrument is provided with four measuring probes for extra wide thickness ranges, and requires only ⅛-inch circle area for measurement. It can be used for sorting and matching metals and alloys. **Unit Process Assemblies, Inc., 61 E. 4th St., New York, New York, U.S.A.**

Multi-Cylinder Supercharger

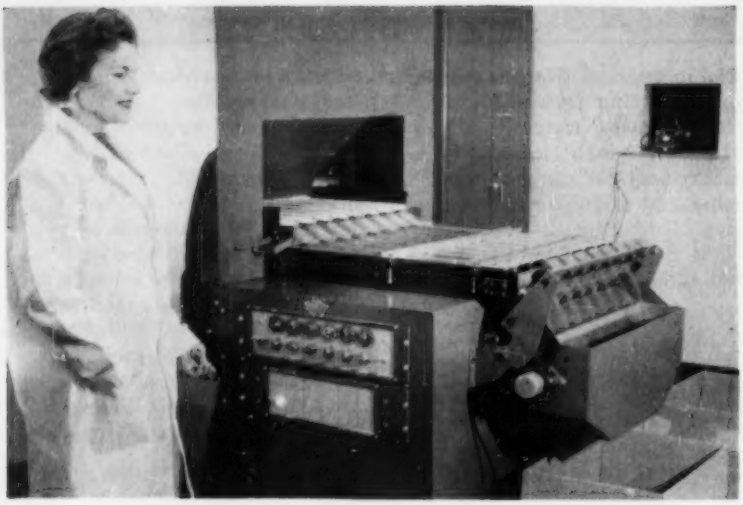
A diesel engine supercharger has been manufactured which uses a multi-cylinder arrangement of opposed double-acting pistons. The machine is said to develop higher compression ratios and efficiencies than are obtained with lobe or vane-type positive displacement blowers. It is designed to be used wherever turbo-blowers operate at a disadvantage—e.g. with engines of less than 500 cubic inches displacement where rotor clearance problems make small turbo-blowers inefficient and costly. **Sir Harry Ricardo and Wellworthy Ltd., Lymington, Hampshire, England.**

Enter the Edsel

America's newest automobile (MD, Sept, p28) has made its debut at last. The two Edsel models above show the car's chief characteristics: an exceptionally high front grille, scallopped sides, dual headlights, and horizontal lights at the rear. Two types of engine—one 303, the other 345 horsepower—are available throughout the series of Edsel models. Engineering innovations include "Teletouch" push button transmission controls located in the hub of the steering wheel, and a single-dial control for heater, defroster and ventilator. Safety rim wheels and self-adjusting brakes are standard with each model.

The chief features of the new car have for long been open secrets. But as ten years and $250-million have gone into the Edsel, its makers, Ford Motor Co., hoped up to the last that it would hold some surprise for the public.

Ford considers initial public reaction to the Edsel—the first new American car since the ill-fated Kaiser in 1946—a vital factor. Hence an intensive Edsel advertising campaign in the U.S.A., which will continue over the next two months. But launching a new automobile is always a risky business, especially in the difficult medium-price range dominated by General Motors Corp., Ford's doughtiest competitor. Edsel officials are only too well aware that the last new U.S. car to survive for more than a few seasons was the '38 Mercury.



For Fast, Accurate Counting

This new high-speed counter can tally up to 5-million manufactured parts in one hour with an accuracy within ⅛ of 1%, allowing manufacturers of small parts to get a quick, accurate count before shipping bulk orders.

A hopper at the top of the machine holds 10 cubic feet of parts. The parts are fed down on to a row of 8 conveyors past phototransistor electric eyes which count them, then down a chute into the shipping box. The box moves out from under the chute when it has been filled, and an empty one takes its place. **Delta Eng. Corp., Melrose, Mass., U.S.A.**

Tractor-Mower

A 10-horsepower tractor, has been designed for the maintenance of plant grounds. Various types of mower—front, center, or rear-mounted 3-gang; center or rear - mounted rotary; rear-mounted Hammer-Knife—can be attached to it. Mounted equipment is hydraulically controlled. **International Harvester Export Co., 180 N. Michigan Ave., Chicago 1, Illinois, U.S.A.**

New Low Resistance Oil Bath Air Cleaner

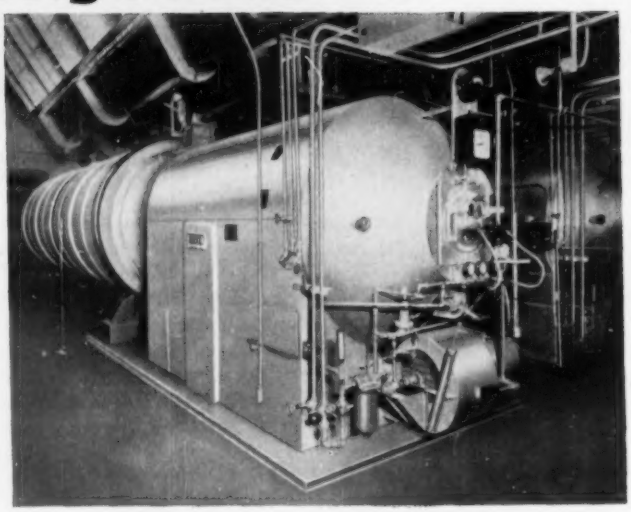
The Type P-V Cycoil, a new industrial oil bath air cleaner, is intended to meet the need for an effective cleaner on engines with low allowable intake resistance. Its features include: a redesigned base for less expensive installation; improved protection at the air intake against snow and water; greater bug protection, and improved vari-flow valves on the entrainment plate. **American Air Filter Co. Inc., Louisville 8, Kentucky, U.S.A.**

3-in-1 dehydrator

. . . saves space
. . . dries uniformly

Materials are dried in a flow of hot air in the Heil machine. Having 3 cylinders in one drum automatically gives each particle correct exposure time based upon its weight due to moisture content. Interior design assures ideal use of drying medium, air activity in all areas of the drum and maximum evaporation within a compact machine.

Let us know the products you need to dry. We'll help you do it efficiently. Write or cable for details.



HEIL DRYERS ARE USED FOR:
Antibiotic Residues
Apple Pomace
Beet Pulp
Brewers' Grains
Canning By-products
Carrots
Citrus Waste
Coffee Hulls
Corncob Meal
Crab Scrap
Distillers' Grains
Feathers
Fish Meal
Forage Crops
Garbage Tankage
Grain By-products
Leafy Drug Plants
Manure
Packing House By-products
Potatoes, Sweet and White
Sages
Sugar Cane Bagasse
Tomato Pomace
Wet Corn Millers' By-products
Wood By-products

Hydraulic dump bodies. Refuse and garbage collectors. Milk pick-up, transport and storage tanks and petroleum tanks. Oil and gas-fired furnaces and conversion burners.

Heil plants at Milwaukee, Wis., Hillside, N. J., and Lancaster, Pa., have a million square feet of manufacturing space and produce quality products for over 50 different types of business and industry.

THE HEIL CO.
Established 1901
Export Office: 3000 W. Montana St., Dept. Q-5
Milwaukee 1, Wisconsin, U.S.A.
Cable:
HEILCO, Milwaukee, Wisconsin, U.S.A.

"And In This Corner..."

Turn a knob—and the world moves into your living room . . . comedy, drama, sporting events, a parade, news . . . the whole wonderful world of television. Helping to keep it bright, clear and steady in millions of living rooms is the television serviceman—a good man to have in your entertainment "corner."

TELEVISION AND RADIO SETS have become so much a part of our daily lives that they are largely taken for granted. You never think about having to do without them. If anything goes wrong, you simply call a serviceman.

Ever think about that serviceman? He's a pretty important figure in your entertainment world . . . the indispensable man who knows *what's* wrong—and *how* to fix it.

Behind his ability to bring the picture back to your screen—and the smile to the children's faces—lies a wealth of specialized knowledge and information, representing a heavy investment in time, training and equipment.

Yes, the man in your entertainment "corner" is an expert. And among his most important "helpers" in bringing you fast, efficient service are Mallory service-engineered electronic parts. These dependable, top-quality, precision-made components have been specifically designed for fast, easy installation in different makes of sets. And Mallory's extensive distributor set-up makes the right parts to fix your set readily available in every part of the country.

Mallory—the company *at home in tomorrow*—is proud to serve the television industry, as well as other leading growth industries . . . with precision products and broad experience in the fields of electronics, electrochemistry and specialized metallurgy.

P.R. MALLORY & CO. Inc.

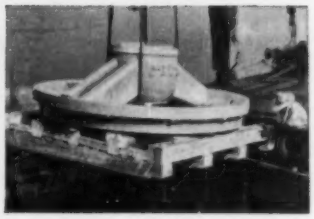
MALLORY

Serving Industry with These Products:

Electromechanical: Resistors • Switches • Tuning Devices • Vibrators
Electrochemical: Capacitors • Mercury and Zinc-Carbon Batteries
Metallurgical: Contacts • Special Metals • Welding Materials

P. R. MALLORY & CO. Inc., INDIANAPOLIS 6, INDIANA

Allis-Chalmers machinery for a new cement plant goes ashore at the island of Taiwan.

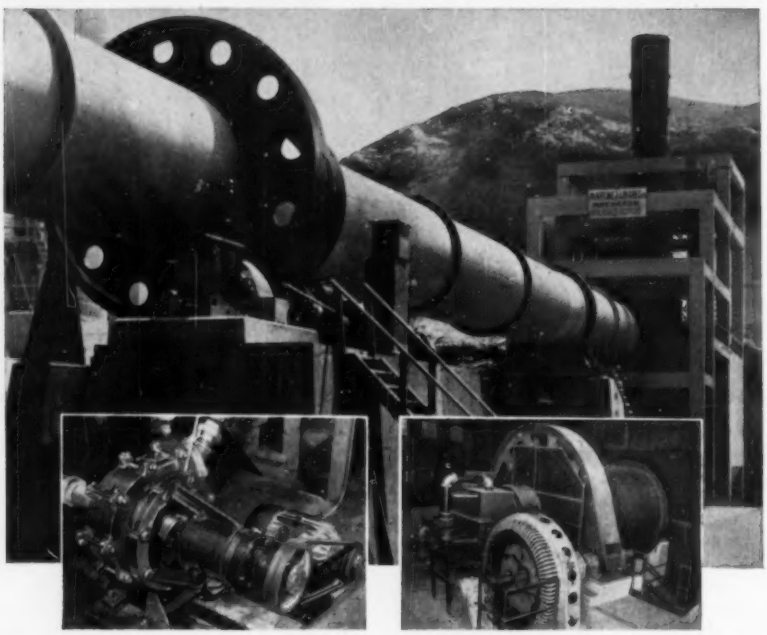


ALLIS-CHALMERS MACHINERY in country after country helps produce the

World's Cement

IN Taiwan, and in other countries throughout the world, successful producers of Portland cement know and respect the machinery designed and built by Allis-Chalmers. From this one reliable source they can get crushers, grinding mills, kilns, coolers, as well as motors, control, pumps and electric power equipment. More than this, they get unexcelled engineering experience and help . . . whether it's a new plant, an expansion, or a single piece of equipment.

In this same broad manner, Allis-Chalmers serves every major industry . . . electric power, ore and mineral processing, manufacturing, city water supply. For help with machinery and production problems, call upon the Allis-Chalmers distributor in your country or write direct to: Allis-Chalmers Export Department, Industries Group, Milwaukee 1, Wisconsin, U.S.A.



KILNS. Large photo shows a 9'6" x 300' Allis-Chalmers rotary kiln installed in a cement plant in Lima, Peru. A-C kilns provide high production and economical operation.

PUMPS. This Allis-Chalmers rubber-lined pump offers up to 50 times longer life than hardest alloy steel pumps for handling abrasive fine mesh materials.

GRINDING MILL. Allis-Chalmers 10½' x 12' ball mill and 900-hp synchronous motor give high capacity and economy. Widely used in cement and ore processing.

A-5346

ALLIS-CHALMERS

ALLIS-CHALMERS DISTRIBUTORS LOCATED THROUGHOUT THE WORLD

Products of the Allis-Chalmers Industrial Equipment, Power and General Products Divisions are distributed by firms in these cities. Distributors of Tractor Group products also are located in principal cities.

ALASKA—Fairbanks.
ARGENTINA—Buenos Aires.
AUSTRALIA—Sydney.
BELGIAN CONGO—Elisabethville.
BELGIUM—Brussels.
BOLIVIA—La Paz.
BRAZIL—Rio de Janeiro, São Paulo, Recife (Pernambuco), Porto Alegre.
BRITISH BORNEO—Sandakan, Jesselton.
BURMA—Rangoon.
CANADA—Montreal, St. Thomas
CHILE—Santiago.
COLOMBIA—Barranquilla, Bogotá, Medellín, Cali.
COSTA RICA—San José.
CUBA—Havana.
DOMINICAN REPUBLIC—Ciudad Trujillo.
ECUADOR—Quito.
EL SALVADOR—San Salvador.
ENGLAND—London.
FINLAND—Helsinki.
FRANCE—Paris.
GREECE—Athens.
GUADELOUPE—Pointe-à-Pitre.
GUATEMALA—Guatemala City.
HAITI—Port-au-Prince.
HAWAII—Honolulu, Hilo.
HONG KONG—Hong Kong.
ICELAND—Reykjavik.
INDIA—Bombay, Calcutta.
IRAN—Teheran.
IRAQ—Baghdad.
ISRAEL—Tel-Aviv.
ITALY—Milan.
JAMAICA—Kingston.
JAPAN—Osaka, Tokyo.
KENYA—Nairobi.
MALAYA—Kuala Lumpur, Ipoh, Kota Bharu, Penang, Malacca, Seremban, Kuantan.
MEXICO—Guadalajara, Mexico City, Monterrey.
NETHERLANDS—Amsterdam.
NEW ZEALAND—Wellington, Auckland.
NICARAGUA—Managua.
NORWAY—Oslo.
PAKISTAN—Karachi.
PANAMA—Panamá City.
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PERU—Lima.
PORTUGAL—Lisbon.
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REPUBLIC OF THE PHILIPPINES—Bacalod City, Cebu, Manila, Negros Occidental.
SARAWAK—Kuching, Sibu, Miri.
SINGAPORE—Singapore.
SOUTH AFRICA—Johannesburg.
SPAIN—Madrid.
SURINAM—Nieuw-Nickerie, Paramaribo.
SWEDEN—Stockholm.
TAIWAN—(FORMOSA)—Taipei.
TANGANYIKA—Dar es Salaam.
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TRINIDAD—Port of Spain.
TURKEY—Istanbul.
URUGUAY—Montevideo.
VENEZUELA—Caracas.

ALLIS-CHALMERS MANUFACTURING COMPANY, Industries Group, Export Department, Milwaukee 1, Wisconsin, U. S. A., Factories in U. S. A., England and Canada.

● YOUR MANAGEMENT READING

Management Digest's editorial staff here again does the "worthwhile reading" for you to save your time. For the following literature, please write on your company letterhead directly to the address given, mentioning Management Digest.

Where to Find It—The European Productivity Agency has a new guide to European sources of technical information. It lists information centers, general and specialized sources of information, a bibliography, complete indexes. 439 pages, $2.50, 16/—, 800 Fr. fr. (European Productivity Agency, OEEC, 2 Rue Andre-Pascal, Paris, France.)

It Pays to Advertise—Here is a selection of worthwhile books on the subject: "Advertising As a Service to Society" breaks down advertising into three types—"educational," "reminder," and "institutional"—and shows how each performs essential functions for both producer and consumer. $1.75, or 12s 6d. (MacDonald & Evans, Ltd., 8 John Street, Bedford Row, London WC 1, England). . . . "Motivation In Advertising" will give you a new picture of the consumer: how he behaves, why he buys, and what factors in advertising influence him. 210 pages, $5.50. . . . "Advertising at the Point of Purchase" is an illustrated reference guide that covers not only budgeting and evaluating point-of-purchase advertising, but also deals with materials, creative ideas and sources, traveling displays, packaging. 248 pages, $6.95. (McGraw-Hill Book Company, 330 West 42nd Street, New York 36, New York.)

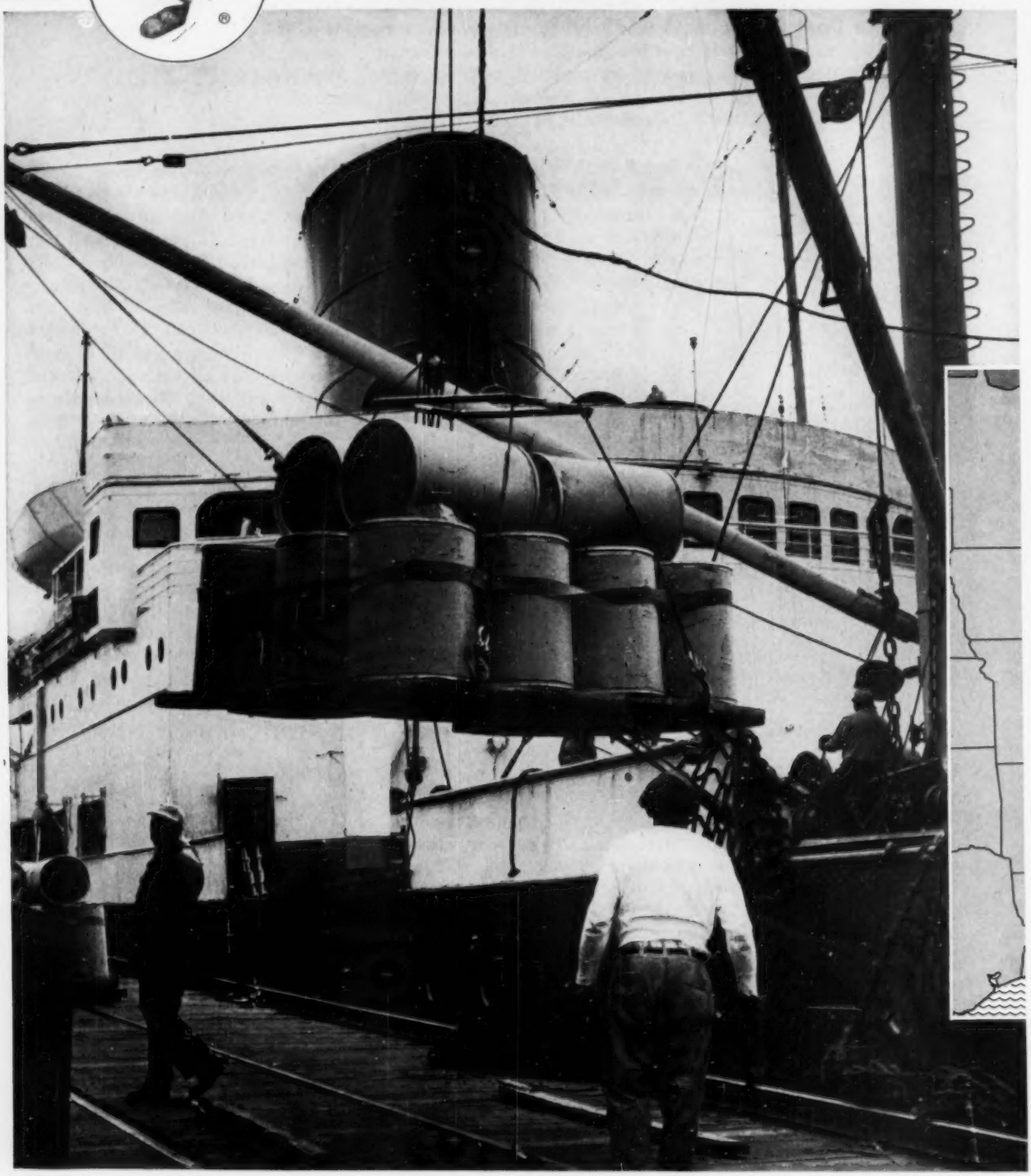
Rating Jobs—"Universal Plan of Job Evaluation" will help you organize a job evaluation program that can be applied to almost any type of business. $10.00. (Philip A. Belanger & Associates, P. O. Box 63, York, Pennsylvania.)

"Maintenance Engineering Handbook"—More than 80 specialists have contributed to this monumental work, a "three-foot shelf" wrapped up in one volume. There are sections on the development of maintenance management, maintenance personnel, planning and scheduling, project control, costs and budgets, and plant facilities and equipment. 1568 pages; $20.00. (McGraw-Hill Book Company, 330 West 42nd Street, New York 36, New York.)

Counting Noses—The United Nations' Demographic Yearbook for 1956 (see page 15) contains a wealth of statistical information for the world-minded market researcher. There are detailed population breakdowns, by country, religion, language, birth-place, race; also cross-classifications of the working segment of populations by age, sex, occupation, industry. 751 pages, $7.00 (or equivalent), paperbound. (Your U.N. Sales Agent; or Sales Section, U.N., New York; or Sales Section, U.N., Palais des Nations, Geneva, Switzerland.)

Bulletins from Industry—Air Separators, and their use in closed-circuit grinding systems, are described in a new Dry Processing Equipment catalog. (Sturtevant Mill Company, Park & Clayton Streets, Boston, Massachusetts). . . . A 20 page booklet shows how the "Tote" system can help solve your bulk material handling problems. (Tote System Inc., Beatrice, Nebraska). . . . Bulletin 274B discusses the operation of the Type W Roto-Clone dust collector in detail. (American Air Filter Company, Inc., 215 Central Avenue, Louisville 8, Kentucky). . . . Detailed information, test reports, comparative strength diagrams, other engineering data covering a new Belgian high early strength portland cement is presented in 12 page bulletin. (Cimenteries & Briqueteries Reunies, 34 Boulevard de Waterloo, Brussels, Belgium.)

SHIP THROUGH NEWPORT NEWS..

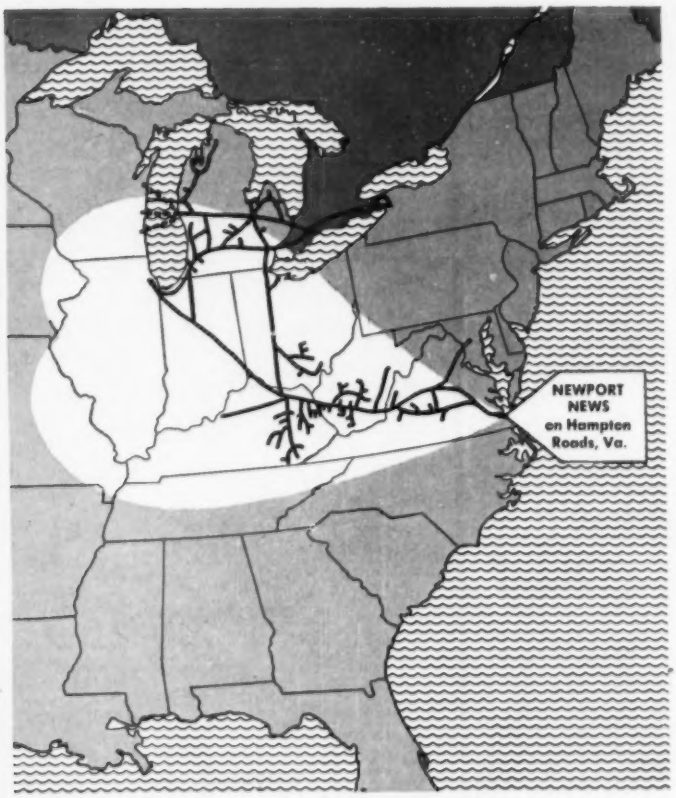


Hundreds of skilled and willing longshoremen work at C&O piers with a full complement of cranes, hoists, conveyors, pipe lines, and material handling machines to aid rapid, safe movement of every type of freight.

Safe handling

An important advantage at the Port of Newport News, Virginia, is that Chesapeake and Ohio tracks go directly to shipside at C&O piers. There is no drayage or lighterage.

Newport News longshoremen are generally a responsible type. Many have worked here all their lives, and their fathers worked here before them. They take pride in their skill and knowledge of just how cargo should be stowed or unloaded. And they have every mechanical facility for handling light, heavy or bulk cargo. All these things help to produce damage-free shipments.



Closer to the Heart of America

Because Newport News is actually closer to the great industrial and agricultural areas of the Midwest and Midsouth, it enjoys a lower inland freight rate than other North Atlantic ports. Shipping times are generally faster, too.

These Factors Make Newport News a Great Seaport

- strategic location
- efficient handling equipment
- on busy ice-free Hampton Roads, one of world's finest harbors
- storage-in-transit. Over 37 million cubic feet of warehousing facilities
- export packing service
- large covered merchandise piers plus open piers with modern facilities for bulk cargo
- coordinated rail-and-sea transport

Chesapeake and Ohio's World Commerce Department assists exporters, importers, forwarding agents, steamship operators on all matters relating to rail and ocean shipping of overseas and intercoastal freight. Write for free illustrated booklet telling why it's easier to use the C&O Port of Newport News.

Chesapeake and Ohio Railway

WORLD COMMERCE DEPARTMENT, NEWPORT NEWS, VA.

World Commerce Dept. Offices: New York 7, N. Y., 233 Broadway • Chicago 4, Ill., 327 S. LaSalle Bldg. Detroit 26, Mich., 525 Lafayette Bldg. • Richmond 10, Va., 909 East Main St. • Stockholm, Sweden, Kungsgatan 7

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American Automobile
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Business Week
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Engineering & Mining Journal
E&MJ Metal & Mineral Markets
Engineering News-Record
Factory Management & Maintenance
Fleet Owner
Food Engineering
Industrial Distribution
Ingenieria Internacional Construccion
Ingenieria Internacional Industria
Metalworking Production (London)
National Petroleum News
Nucleonics
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